US009264285B2

(12) **United States Patent**
Nakamura et al.

(10) **Patent No.: US 9,264,285 B2**
(45) **Date of Patent: Feb. 16, 2016**

(54) **COMMUNICATION SYSTEM AND SERVER**

(71) Applicant: **Hitachi, Ltd.**, Tokyo (JP)

(72) Inventors: **Shota Nakamura**, Kawasaki (JP); **Eri Kawai**, Yokohama (JP); **Takuma Utsunomiya**, Tokyo (JP)

(73) Assignee: **Hitachi, Ltd.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/291,963**

(22) Filed: **May 30, 2014**

(65) **Prior Publication Data**

US 2014/0256299 A1 Sep. 11, 2014

Related U.S. Application Data

(63) Continuation of application No. 13/220,210, filed on Aug. 29, 2011, now Pat. No. 8,868,759.

(30) **Foreign Application Priority Data**

Nov. 11, 2010 (JP) 2010-252440

(51) **Int. Cl.**
H04W 4/16 (2009.01)
H04L 29/06 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04L 29/06*** (2013.01); ***H04L 29/08072*** (2013.01); ***H04L 29/08108*** (2013.01); ***H04L 29/08576*** (2013.01); ***H04L 65/1073*** (2013.01); ***H04L 65/1083*** (2013.01); ***H04M 3/42059*** (2013.01); ***H04M 3/42195*** (2013.01); ***H04M 3/42221*** (2013.01); ***H04M 3/4931*** (2013.01);
(Continued)

(58) **Field of Classification Search**
USPC 455/414.1; 709/227
See application file for complete search history.

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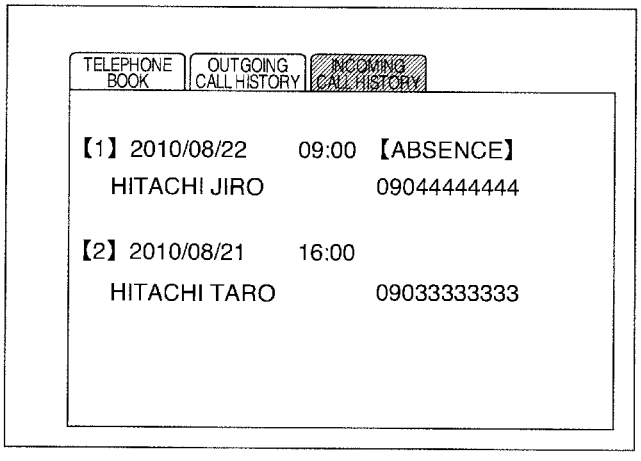
Primary Examiner — Kyung H Shin
(74) *Attorney, Agent, or Firm* — Foley & Lardner LLP

(57) **ABSTRACT**

A communication system and server includes a first memory for storing terminal information of a first terminal and a second terminal, a second memory for storing outgoing call history information of at least either the first terminal or the second terminal, a third memory for storing incoming call history information of at least either the first terminal or the second terminal; and a processing unit for reading out the information from the first memory to control at least either information of the second memory or the third memory in accordance with information contained in a notification from the communication device when setting the connection between at least either the first terminal or the second terminal and the communication device, therefore, two parties to be communicated with each other specify a connection terminal of a call source.

13 Claims, 26 Drawing Sheets



(51) **Int. Cl.**

H04M 3/42	(2006.01)
H04L 29/08	(2006.01)
H04M 3/493	(2006.01)
H04M 3/56	(2006.01)
H04M 7/12	(2006.01)
H04W 4/02	(2009.01)

(52) **U.S. Cl.**

CPC ***H04M 3/56*** (2013.01); ***H04M 7/1205*** (2013.01); ***H04W 4/02*** (2013.01); ***H04W 4/16*** (2013.01); *H04M 2203/551* (2013.01); *H04M 2207/18* (2013.01)

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FIG. 1

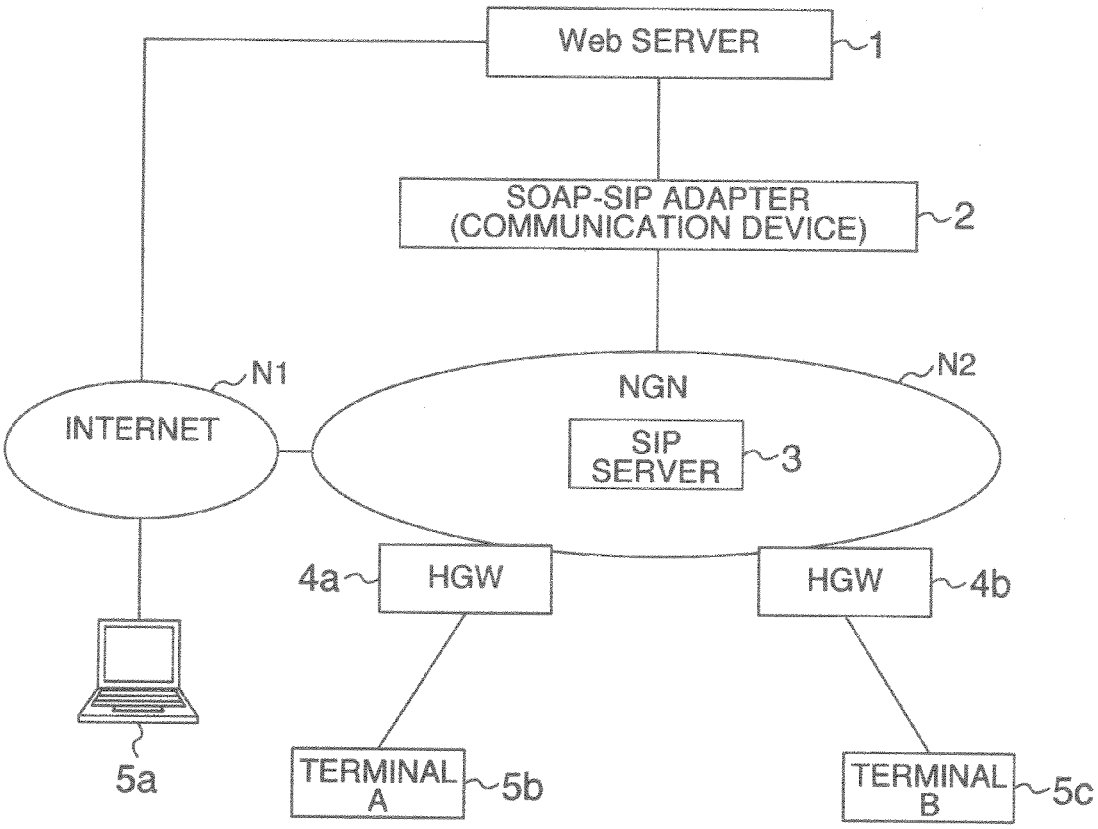

Web SERVER
1
SOAP-SIP ADAPTER
(COMMUNICATION DEVICE)
2
N1
INTERNET
NGN
N2
SIP
SERVER
3
4a
HGW
HGW
4b
5a
TERMINAL
A
5b
TERMINAL
B
5c

FIG. 2

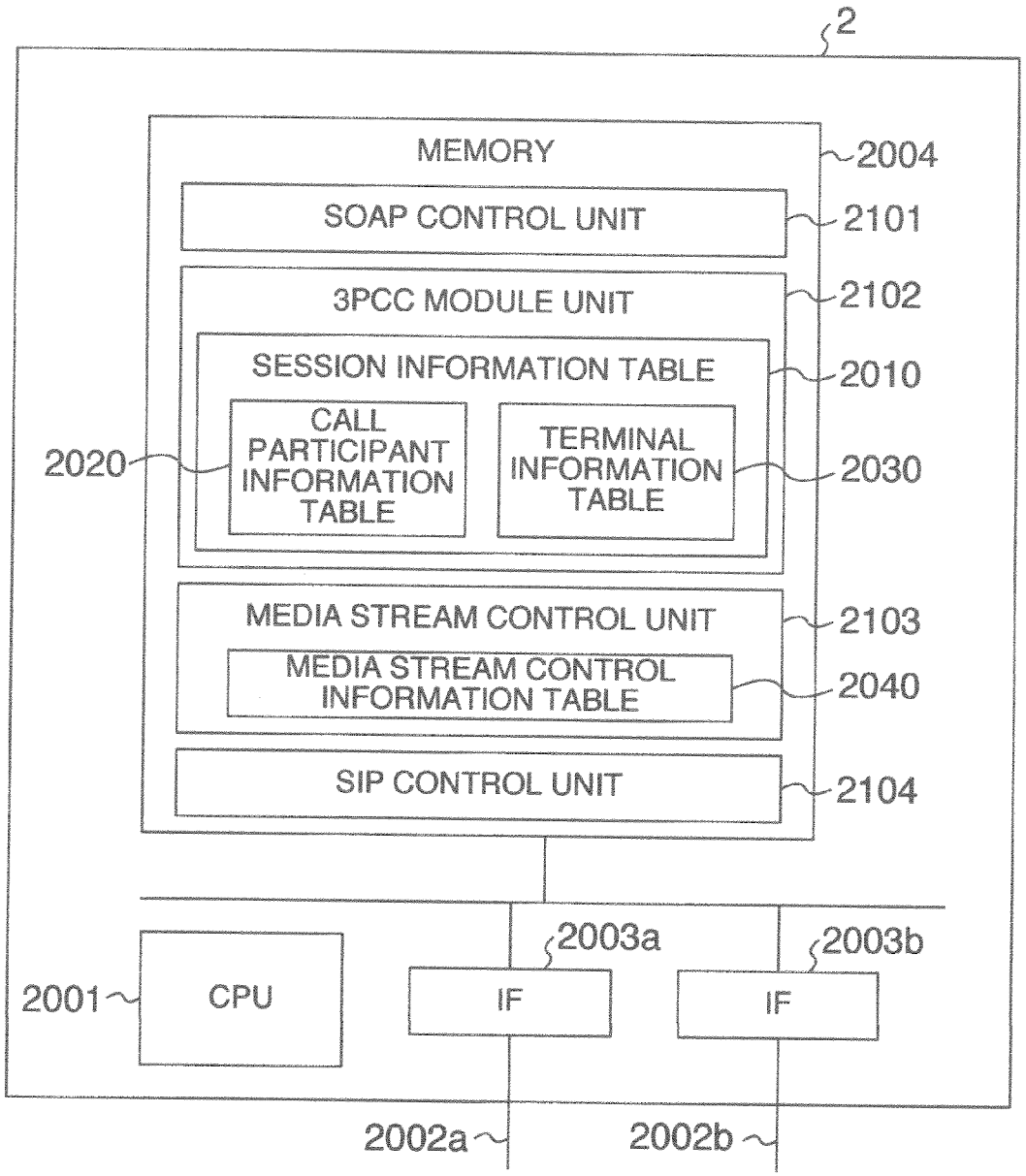

2
MEMORY
2004
SOAP CONTROL UNIT
2101
3PCC MODULE UNIT
2102
SESSION INFORMATION TABLE
2010
CALL PARTICIPANT INFORMATION TABLE
2020
TERMINAL INFORMATION TABLE
2030
MEDIA STREAM CONTROL UNIT
2103
MEDIA STREAM CONTROL INFORMATION TABLE
2040
SIP CONTROL UNIT
2104
2003a
2003b
2001
CPU
IF
IF
2002a
2002b

FIG. 3A

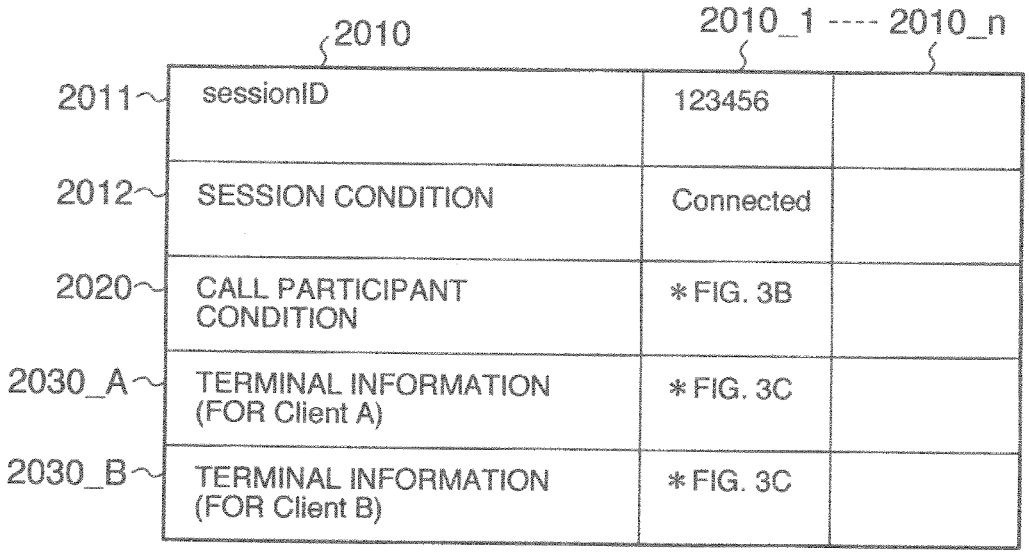

2010
2010_1 ---- 2010_n
2011
sessionID
123456
2012
SESSION CONDITION
Connected
2020
CALL PARTICIPANT CONDITION
* FIG. 3B
2030_A
TERMINAL INFORMATION (FOR Client A)
* FIG. 3C
2030_B
TERMINAL INFORMATION (FOR Client B)
* FIG. 3C

FIG. 3B

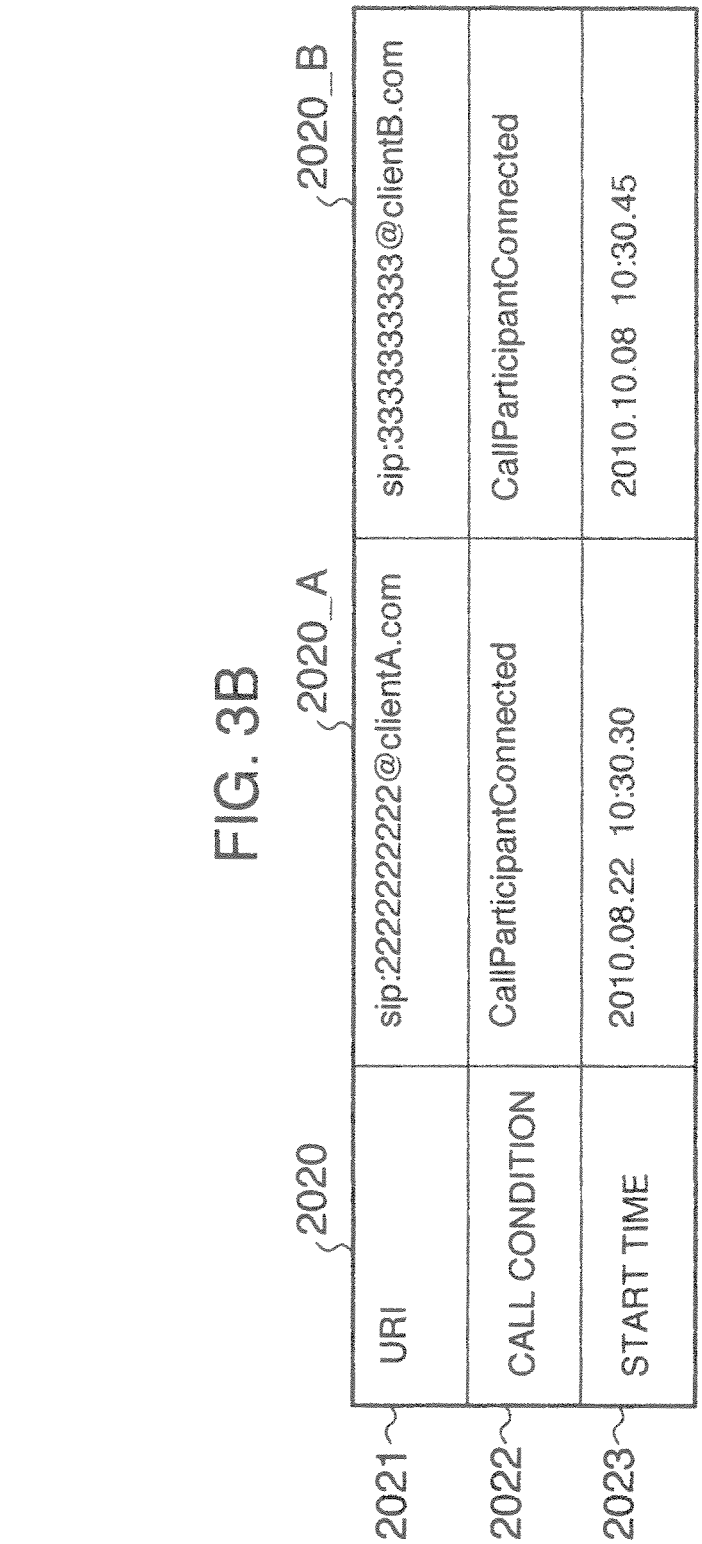

2020
2020_A
2020_B
2021
2022
2023
URI
CALL CONDITION
START TIME
sip:2222222222@clientA.com
CallParticipantConnected
2010.08.22 10:30.30
sip:3333333333@clientB.com
CallParticipantConnected
2010.10.08 10:30.45

FIG. 3C

	2030	2030_A	2030_B
2031	HANDLE VALUE	987654	765432
2032	sessionID	123456	123456
2033	TERMINAL CONDITION	CallComplete	CallComplete
2034	Role	UA-A	UA-B
2035	send SDP INFORMATION	----- 10.0.1.1 10000	----- 10.0.1.1 10000
2036	recv SDP INFORMATION	----- 10.0.2.1 20000	----- 10.0.2.2 30000
2037	From URI	sip:1111111111 @SSA.com	sip:1111111111 @SSA.com
2038	To URI	sip:2222222222 @clientA.com	sip:3333333333 @clientB.com

FIG. 3D

	2040	2040_1	---- 2040_n
2041	sessionID	123456	
2042	MEDIA STREAM TRANSMISSION/ RECEPTION IP ADDRESS	10.0.1.1	
2043	MEDIA STREAM TRANSMISSION/ RECEPTION PORT NUMBER	10000	
2044	DESTINATION IP ADDRESS 1	10.0.2.1	
2045	DESTINATION PORT NUMBER 1	20000	
2046	DESTINATION IP ADDRESS 2	10.0.2.2	
2047	DESTINATION PORT NUMBER 2	30000	

FIG. 4

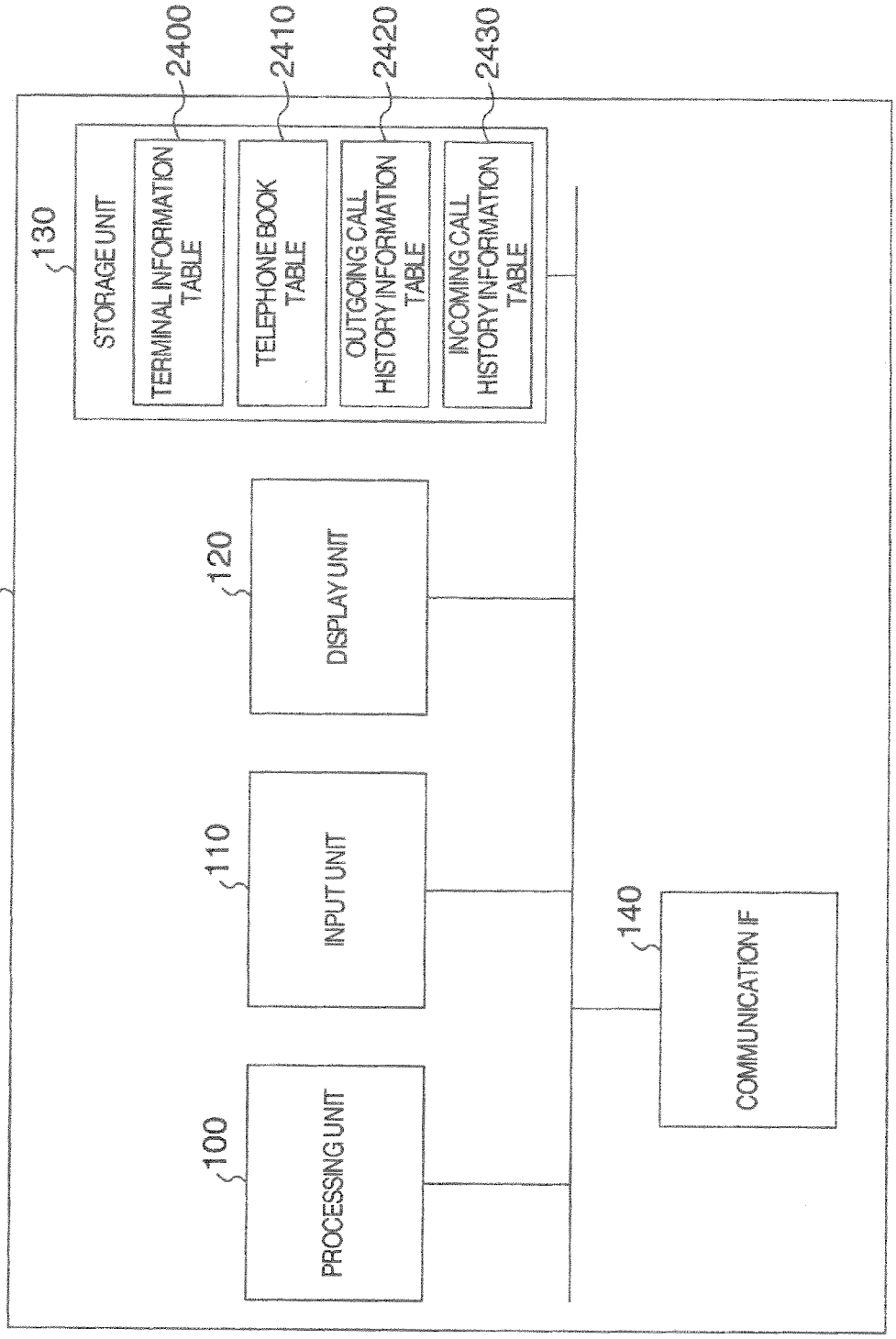
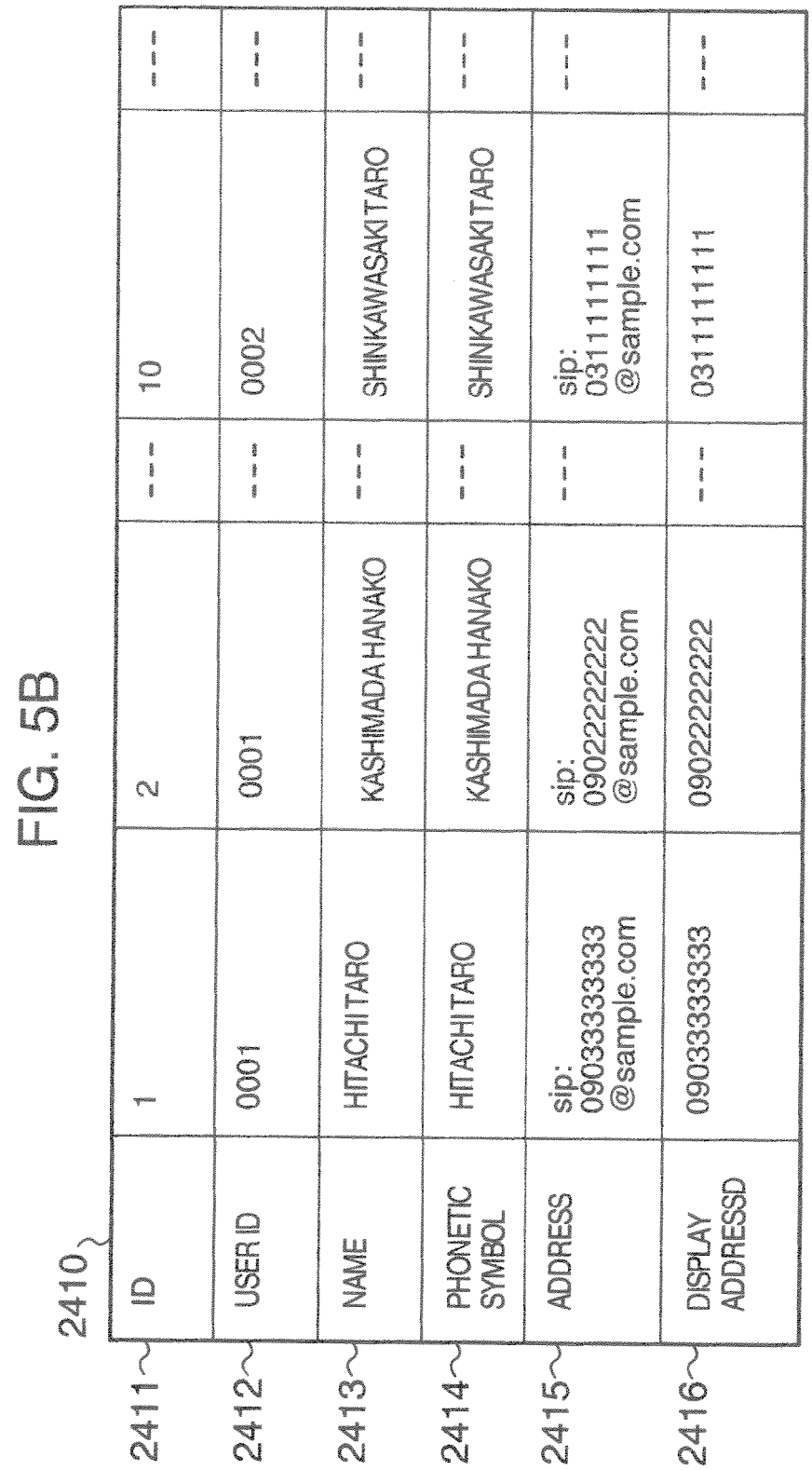

1
100
PROCESSING UNIT
110
INPUT UNIT
120
DISPLAY UNIT
130
STORAGE UNIT
TERMINAL INFORMATION TABLE
2400
TELEPHONE BOOK TABLE
2410
OUTGOING CALL HISTORY INFORMATION TABLE
2420
INCOMING CALL HISTORY INFORMATION TABLE
2430
140
COMMUNICATION IF

FIG. 5A

2400

2401	USER ID	0001	0001	0002	0003	0004	---
2402	TERMINAL ID	01	02	01	01	01	---
2403	TERMINAL NAME	FIXED	MOBILE	MOBILE	MOBILE	MOBILE	---
2404	TELEPHONE NUMBER	0311111111	09011111111	09022222222	09033333333	09044444444	---
2405	Correlator	11111111-11ab-11ab-ffff-1111111111111		22222222-12ab-12ab-ffff-2222222222222	33333333-13ab-13ab-ffff-3333333333333	44444444-14ab-14ab-ffff-4444444444444	---
2406	TERMINAL REGISTRATION CONDITION	REGISTERED	UNREGISTERED	REGISTERED	REGISTERED	REGISTERED	---

FIG. 5B


2410
2411
2412
2413
2414
2415
2416
ID
USER ID
NAME
PHONETIC SYMBOL
ADDRESS
DISPLAY ADDRESSD
1
0001
HITACHITARO
HITACHITARO
sip: 09033333333 @sample.com
09033333333
2
0001
KASHIMADAHANAKO
KASHIMADAHANAKO
sip: 09022222222 @sample.com
09022222222

10
0002
SHINKAWASAKITARO
SHINKAWASAKITARO
sip: 0311111111 @sample.com
0311111111

FIG. 5C

2420

2421	ID	1	2	3	---
2422	USER ID	0001	0001	0002	---
2423	SESSION ID	1000000	2000000	3000000	---
2424	CALL DESTINATION ADDRESS	sip: 09033333333 @sample.com	sip: 0322222222 @sample.com	sip: 09044444444 @sample.com	---
2425	CALL DESTINATION ADDRESS DISPLAY NAME	09033333333	0322222222	09044444444	---
2426	CALL DESTINATION NAME	HITACHI TARO	KASHIMADA HANAKO	HITACHI JIRO	---
2427	CALL SOURCE ADDRESS	sip: 0311111111 @sample.com	sip: 0311111111 @sample.com	sip: 09022222222 @sample.com	---
2428	OUTGOING CALL DATE AND TIME	2010.08.22 10:30	2010.08.20 19:00	2010.08.25 12:00	---

FIG. 5D

2430

2431	ID	1	2	3	---
2432	USER ID	0001	0001	0002	---
2433	SESSION ID	1111111	2222222	3333333	---
2434	CALL SOURCE ADDRESS	sip: 09044444444 @sample.com	sip: 09033333333 @sample.com	sip: 09033333333 @sample.com	---
2435	CALL SOURCE ADDRESS DISPLAY NAME	09044444444	09033333333	09033333333	---
2436	CALL SOURCE NAME	HITACHI JIRO	HITACHI TARO	HITACHI TARO	---
2437	ABSENCE INCOMING CALL	true	false	false	---
2438	INCOMING CALL DATE AND TIME	2010.08.22 09:00	2010.08.21 16:00	2010.08.25 12:00	---

FIG. 6

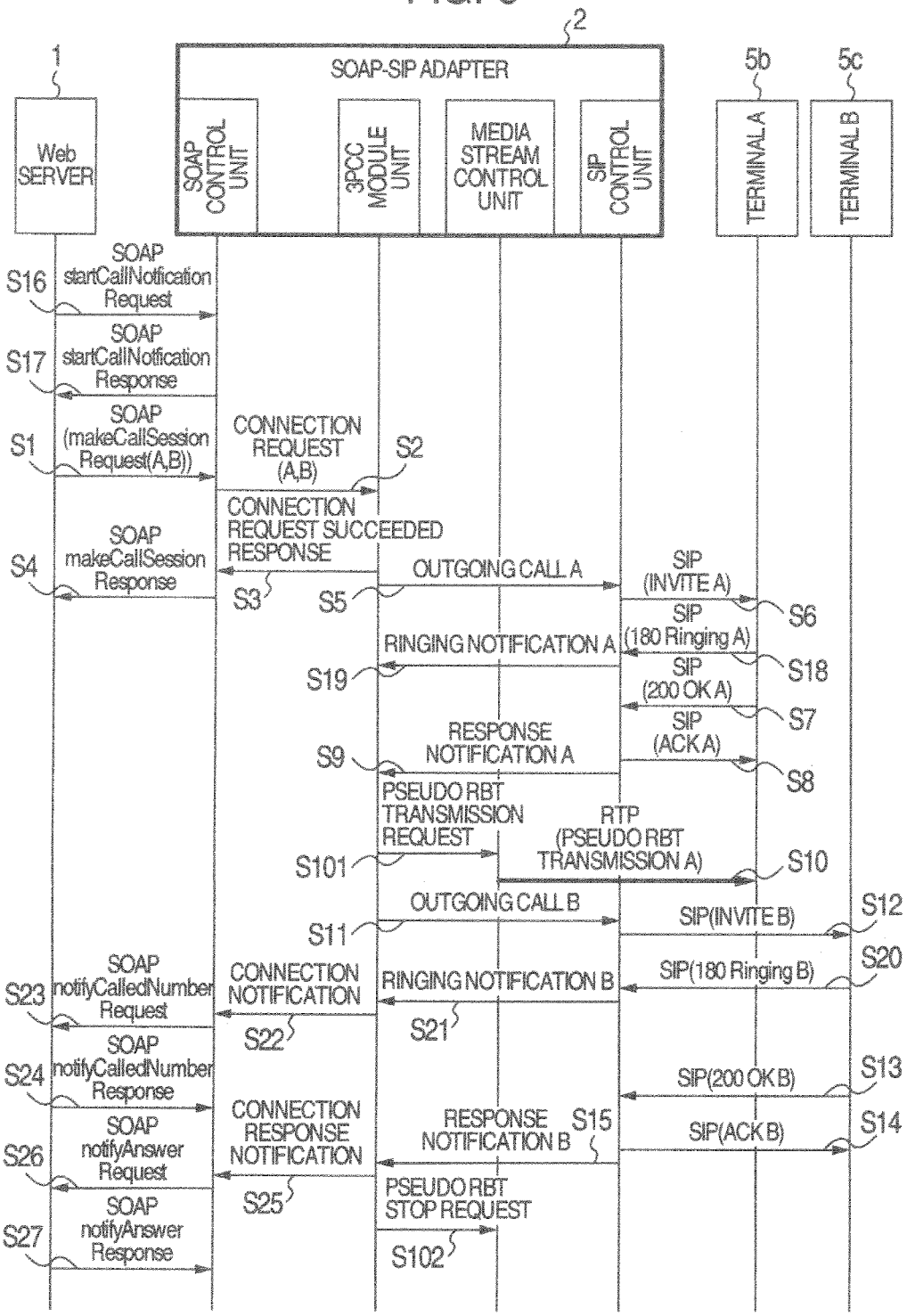

1
2
SOAP-SIP ADAPTER
5b
5c
Web SERVER
SOAP CONTROL UNIT
3PCC MODULE UNIT
MEDIA STREAM CONTROL UNIT
SIP CONTROL UNIT
TERMINAL A
TERMINAL B
S16 SOAP startCallNotification Request
S17 SOAP startCallNotification Response
S1 SOAP (makeCallSession Request(A,B))
CONNECTION REQUEST (A,B)
S2
CONNECTION REQUEST SUCCEEDED RESPONSE
S3
S4 SOAP makeCallSession Response
OUTGOING CALL A
S5
SIP (INVITE A)
S6
SIP (180 Ringing A)
S18
RINGING NOTIFICATION A
S19
SIP (200 OK A)
S7
SIP (ACK A)
S8
S9 RESPONSE NOTIFICATION A
PSEUDO RBT TRANSMISSION REQUEST
S101
RTP (PSEUDO RBT TRANSMISSION A)
S10
OUTGOING CALL B
S11
SIP(INVITE B)
S12
SIP(180 Ringing B)
S20
RINGING NOTIFICATION B
S21
S22
CONNECTION NOTIFICATION
S23 SOAP notifyCalledNumber Request
S24 SOAP notifyCalledNumber Response
SIP(200 OK B)
S13
SIP(ACK B)
S14
S15 RESPONSE NOTIFICATION B
CONNECTION RESPONSE NOTIFICATION
S25
S26 SOAP notifyAnswer Request
PSEUDO RBT STOP REQUEST
S102
S27 SOAP notifyAnswer Response

FIG. 7

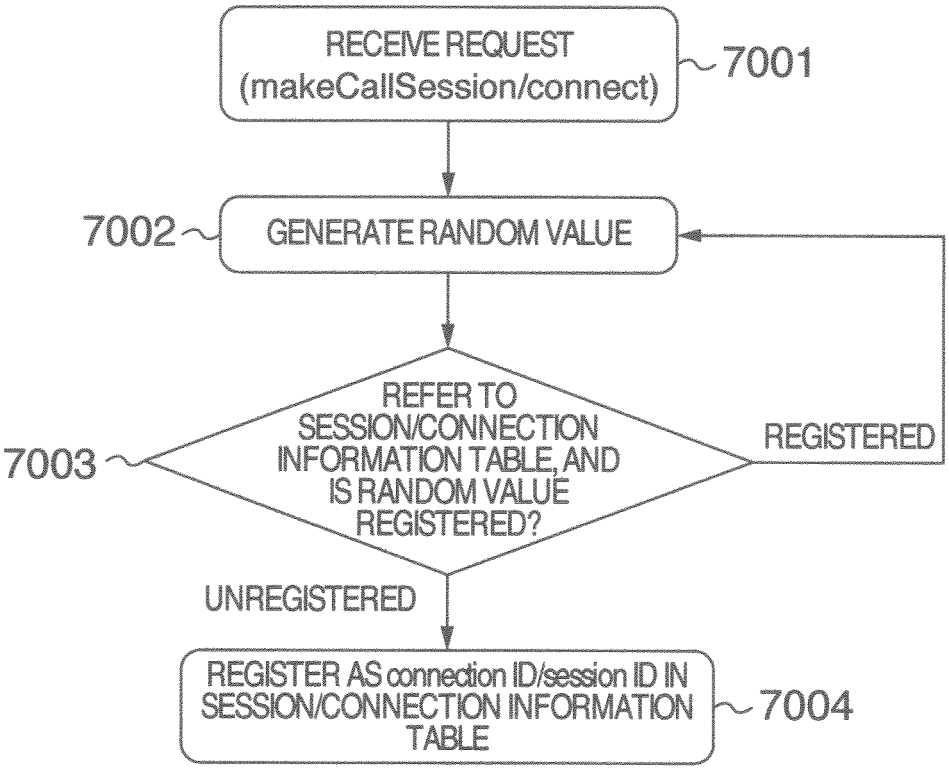

RECEIVE REQUEST (makeCallSession/connect)
7001
7002
GENERATE RANDOM VALUE
REFER TO SESSION/CONNECTION INFORMATION TABLE, AND IS RANDOM VALUE REGISTERED?
7003
REGISTERED
UNREGISTERED
REGISTER AS connection ID/session ID IN SESSION/CONNECTION INFORMATION TABLE
7004

FIG. 8

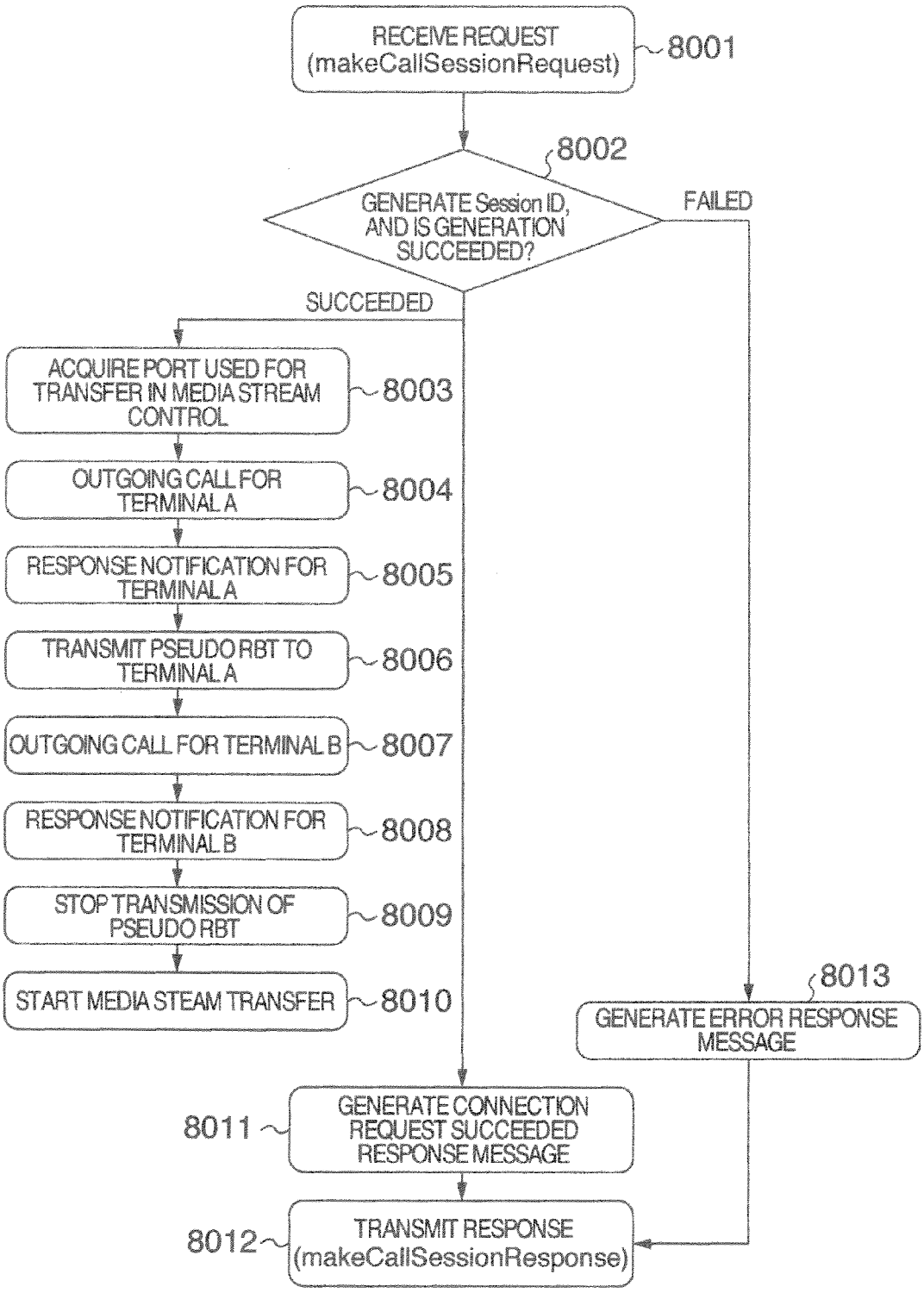

RECEIVE REQUEST (makeCallSessionRequest)
8001
8002
GENERATE Session ID, AND IS GENERATION SUCCEEDED?
FAILED
SUCCEEDED
ACQUIRE PORT USED FOR TRANSFER IN MEDIA STREAM CONTROL
8003
OUTGOING CALL FOR TERMINAL A
8004
RESPONSE NOTIFICATION FOR TERMINAL A
8005
TRANSMIT PSEUDO RBT TO TERMINAL A
8006
OUTGOING CALL FOR TERMINAL B
8007
RESPONSE NOTIFICATION FOR TERMINAL B
8008
STOP TRANSMISSION OF PSEUDO RBT
8009
START MEDIA STEAM TRANSFER
8010
8013
GENERATE ERROR RESPONSE MESSAGE
8011
GENERATE CONNECTION REQUEST SUCCEEDED RESPONSE MESSAGE
8012
TRANSMIT RESPONSE (makeCallSessionResponse)

FIG. 9

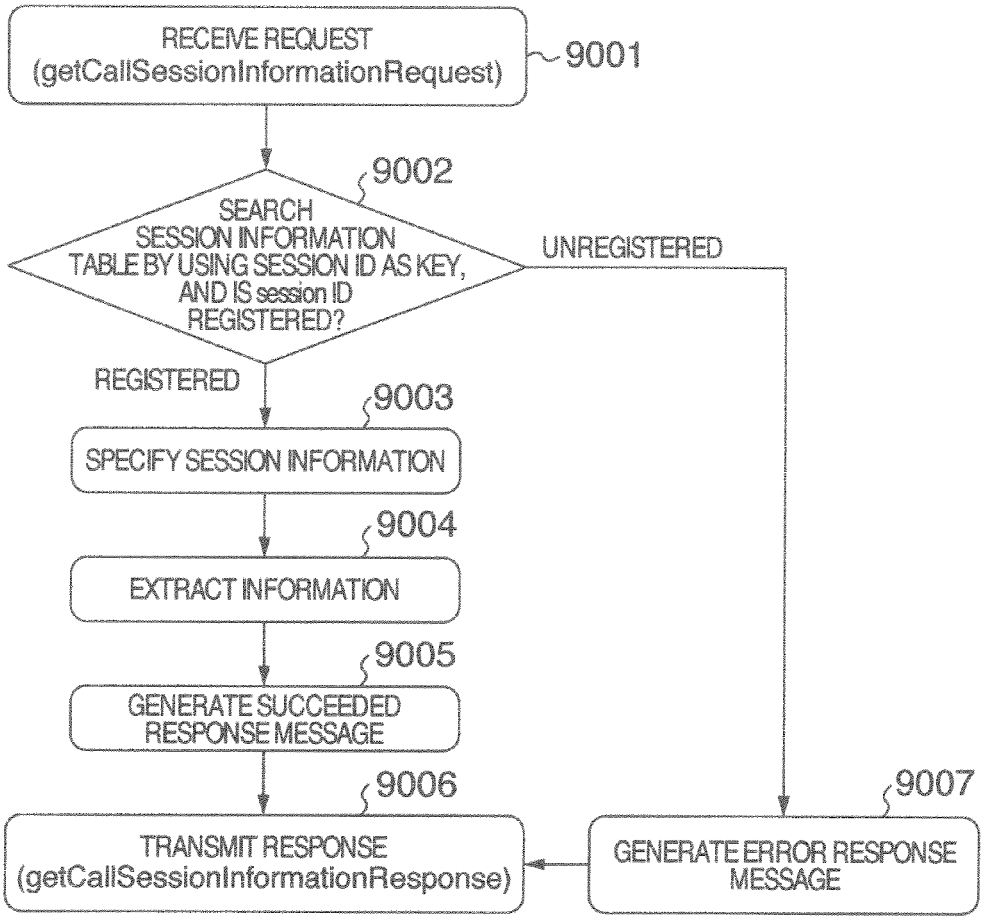

RECEIVE REQUEST
(getCallSessionInformationRequest)
9001
9002
SEARCH
SESSION INFORMATION
TABLE BY USING SESSION ID AS KEY,
AND IS session ID
REGISTERED?
UNREGISTERED
REGISTERED
9003
SPECIFY SESSION INFORMATION
9004
EXTRACT INFORMATION
9005
GENERATE SUCCEEDED
RESPONSE MESSAGE
9006
TRANSMIT RESPONSE
(getCallSessionInformationResponse)
9007
GENERATE ERROR RESPONSE
MESSAGE

FIG. 10

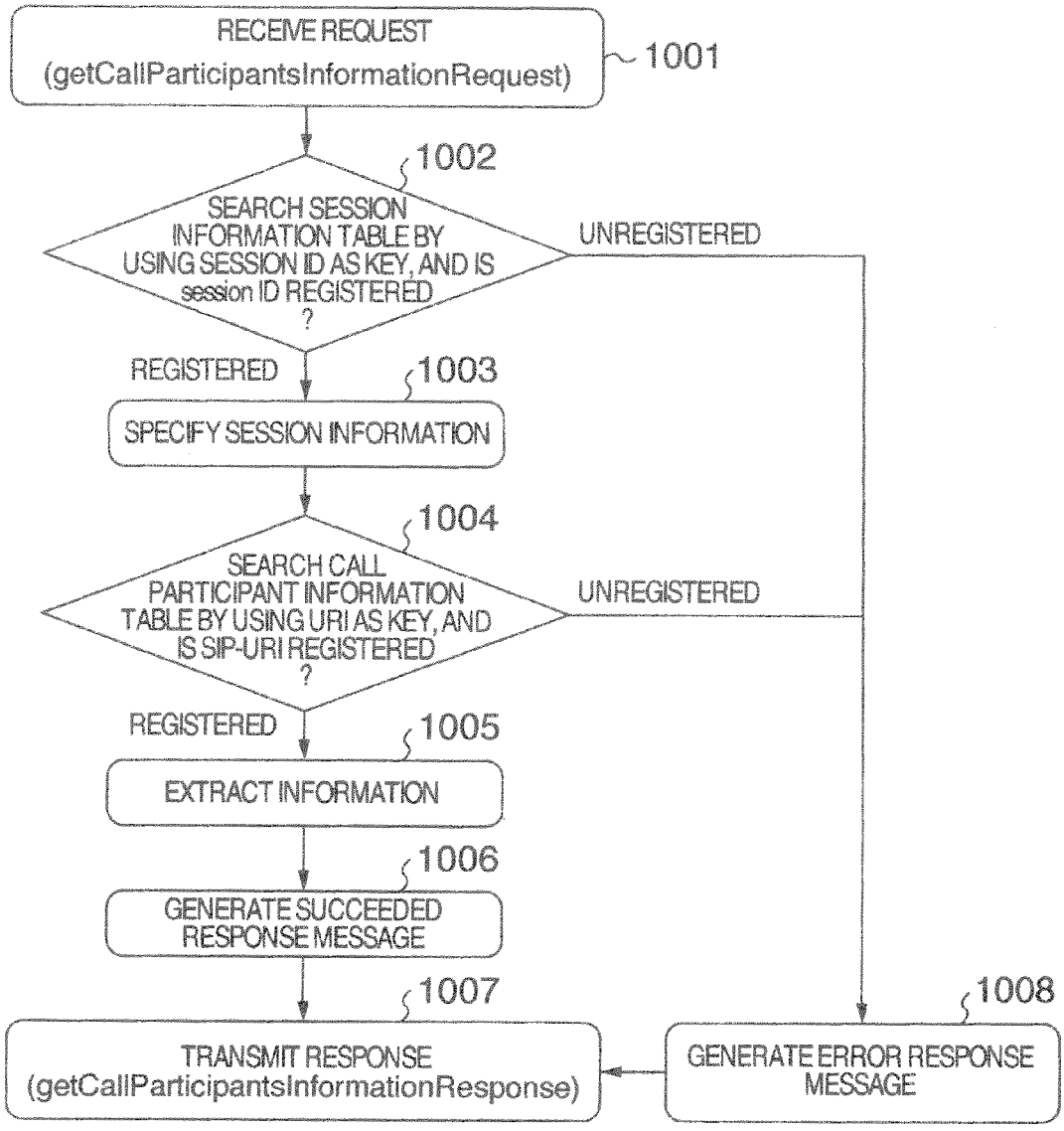

RECEIVE REQUEST
(getCallParticipantsInformationRequest)
1001
1002
SEARCH SESSION INFORMATION TABLE BY USING SESSION ID AS KEY, AND IS session ID REGISTERED ?
UNREGISTERED
REGISTERED
1003
SPECIFY SESSION INFORMATION
1004
SEARCH CALL PARTICIPANT INFORMATION TABLE BY USING URI AS KEY, AND IS SIP-URI REGISTERED ?
UNREGISTERED
REGISTERED
1005
EXTRACT INFORMATION
1006
GENERATE SUCCEEDED RESPONSE MESSAGE
1007
TRANSMIT RESPONSE
(getCallParticipantsInformationResponse)
1008
GENERATE ERROR RESPONSE MESSAGE

FIG. 11

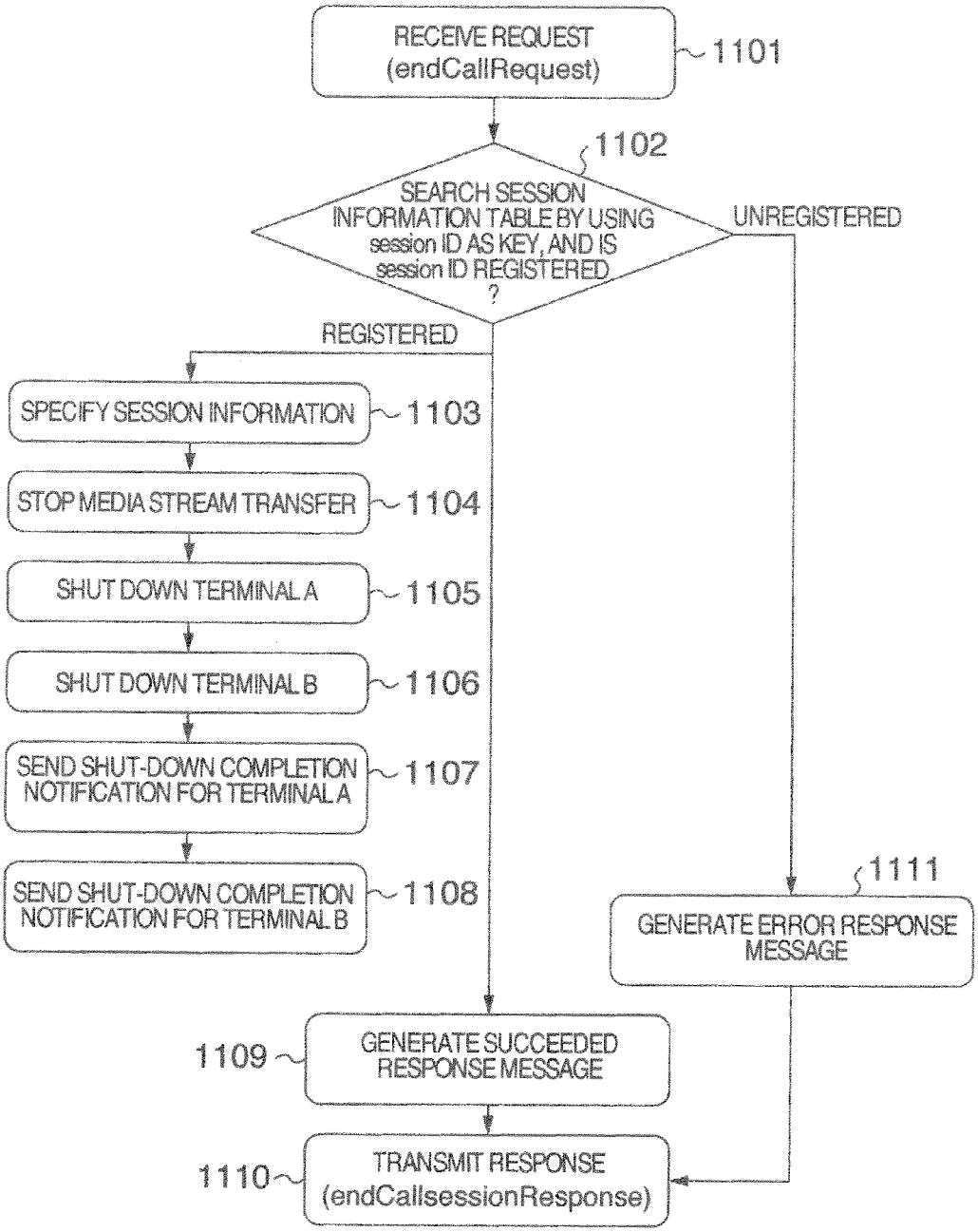

RECEIVE REQUEST (endCallRequest)
1101
1102
SEARCH SESSION INFORMATION TABLE BY USING session ID AS KEY, AND IS session ID REGISTERED ?
UNREGISTERED
REGISTERED
SPECIFY SESSION INFORMATION
1103
STOP MEDIA STREAM TRANSFER
1104
SHUT DOWN TERMINAL A
1105
SHUT DOWN TERMINAL B
1106
SEND SHUT-DOWN COMPLETION NOTIFICATION FOR TERMINAL A
1107
SEND SHUT-DOWN COMPLETION NOTIFICATION FOR TERMINAL B
1108
1111
GENERATE ERROR RESPONSE MESSAGE
1109
GENERATE SUCCEEDED RESPONSE MESSAGE
1110
TRANSMIT RESPONSE (endCallsessionResponse)

FIG. 12

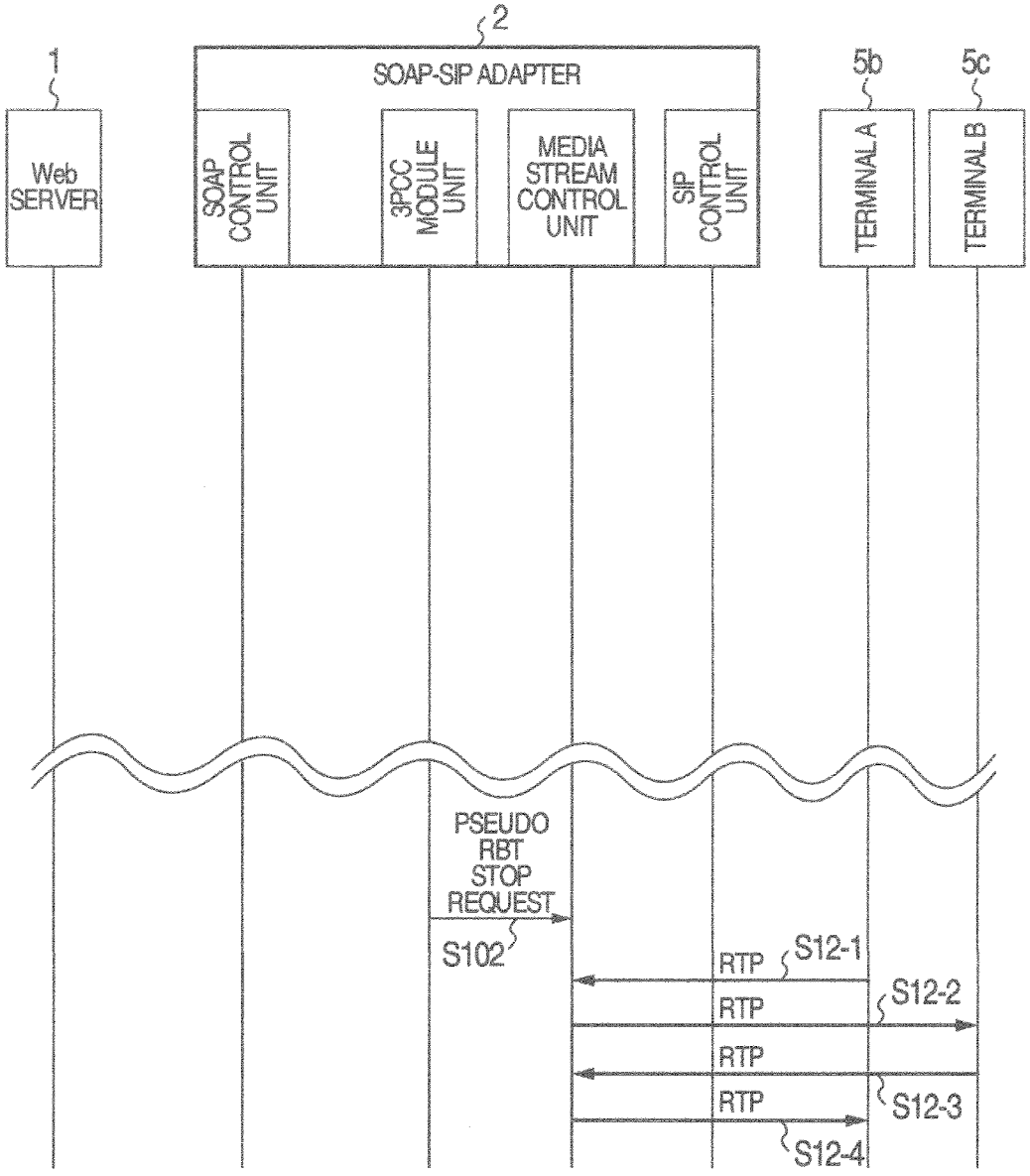

2
1
SOAP-SIP ADAPTER
5b
5c
Web SERVER
SOAP CONTROL UNIT
3PCC MODULE UNIT
MEDIA STREAM CONTROL UNIT
SIP CONTROL UNIT
TERMINAL A
TERMINAL B
PSEUDO RBT STOP REQUEST
S102
RTP
S12-1
RTP
S12-2
RTP
RTP
S12-3
S12-4

FIG. 13

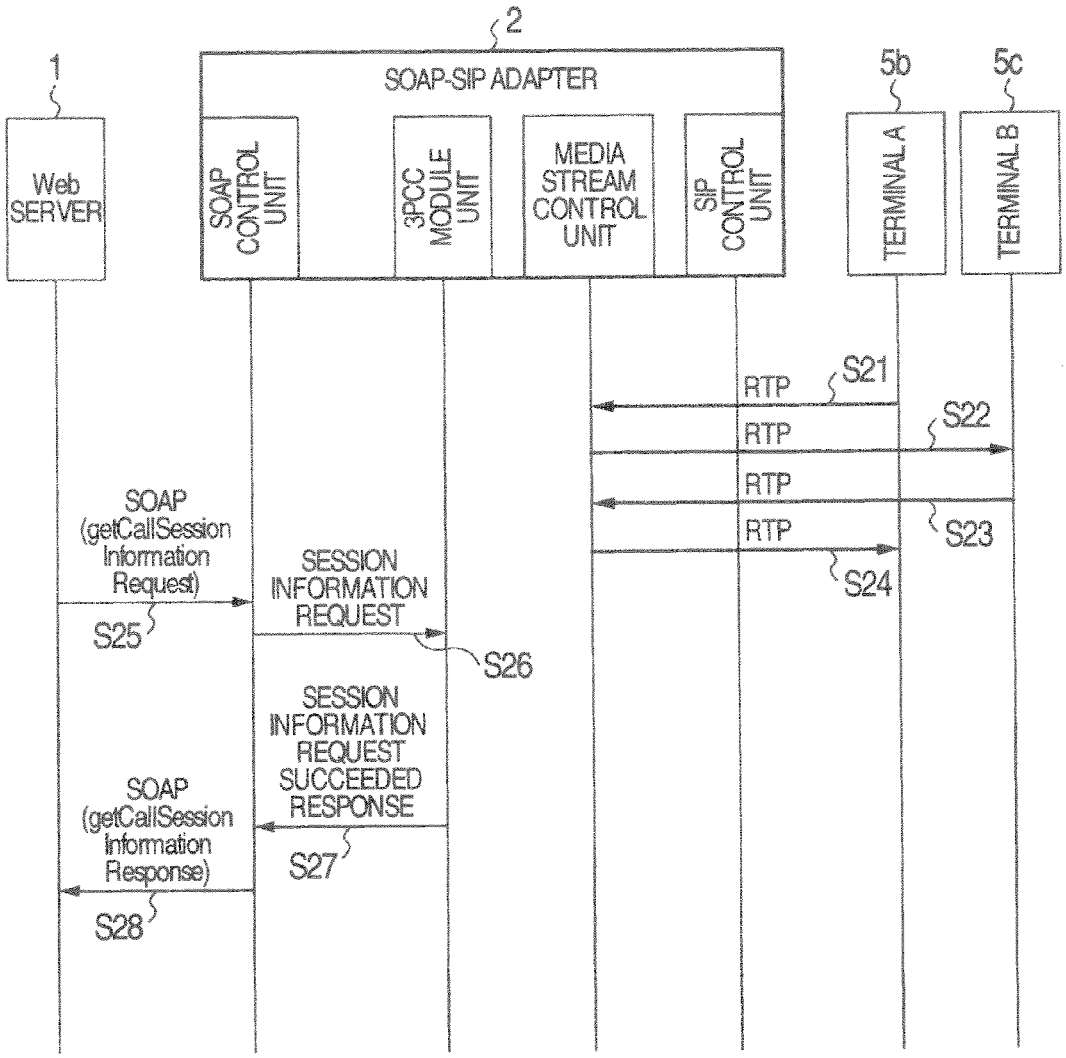

2
1
SOAP-SIP ADAPTER
5b
5c
Web SERVER
SOAP CONTROL UNIT
3PCC MODULE UNIT
MEDIA STREAM CONTROL UNIT
SIP CONTROL UNIT
TERMINAL A
TERMINAL B
RTP
S21
RTP
S22
RTP
RTP
S23
S24
SOAP (getCallSession Information Request)
S25
SESSION INFORMATION REQUEST
S26
SESSION INFORMATION REQUEST SUCCEEDED RESPONSE
S27
SOAP (getCallSession Information Response)
S28

FIG. 14

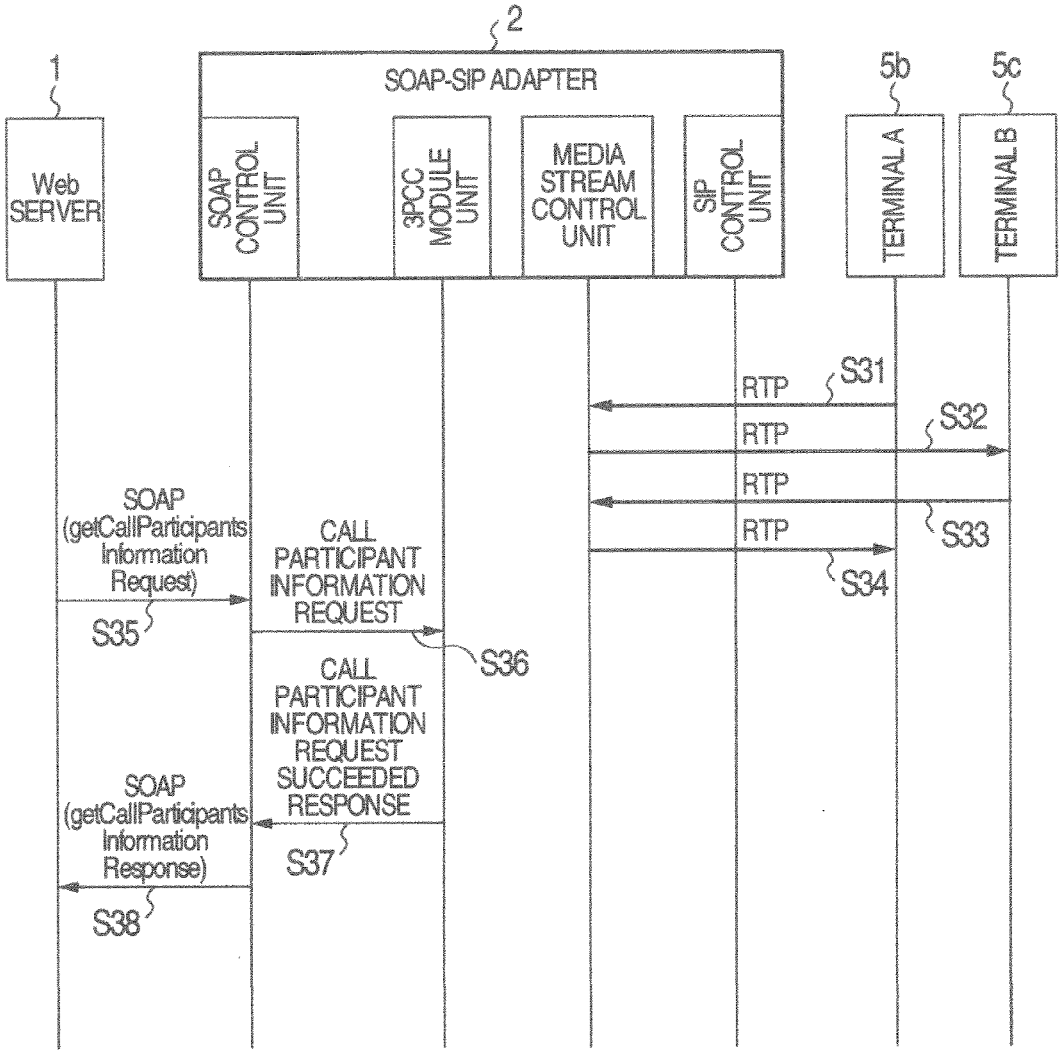

2
1
SOAP-SIP ADAPTER
5b
5c
Web SERVER
SOAP CONTROL UNIT
3PCC MODULE UNIT
MEDIA STREAM CONTROL UNIT
SIP CONTROL UNIT
TERMINAL A
TERMINAL B
RTP
S31
RTP
S32
RTP
RTP
S33
S34
SOAP (getCallParticipants Information Request)
S35
CALL PARTICIPANT INFORMATION REQUEST
S36
CALL PARTICIPANT INFORMATION REQUEST SUCCEEDED RESPONSE
S37
SOAP (getCallParticipants Information Response)
S38

FIG. 15

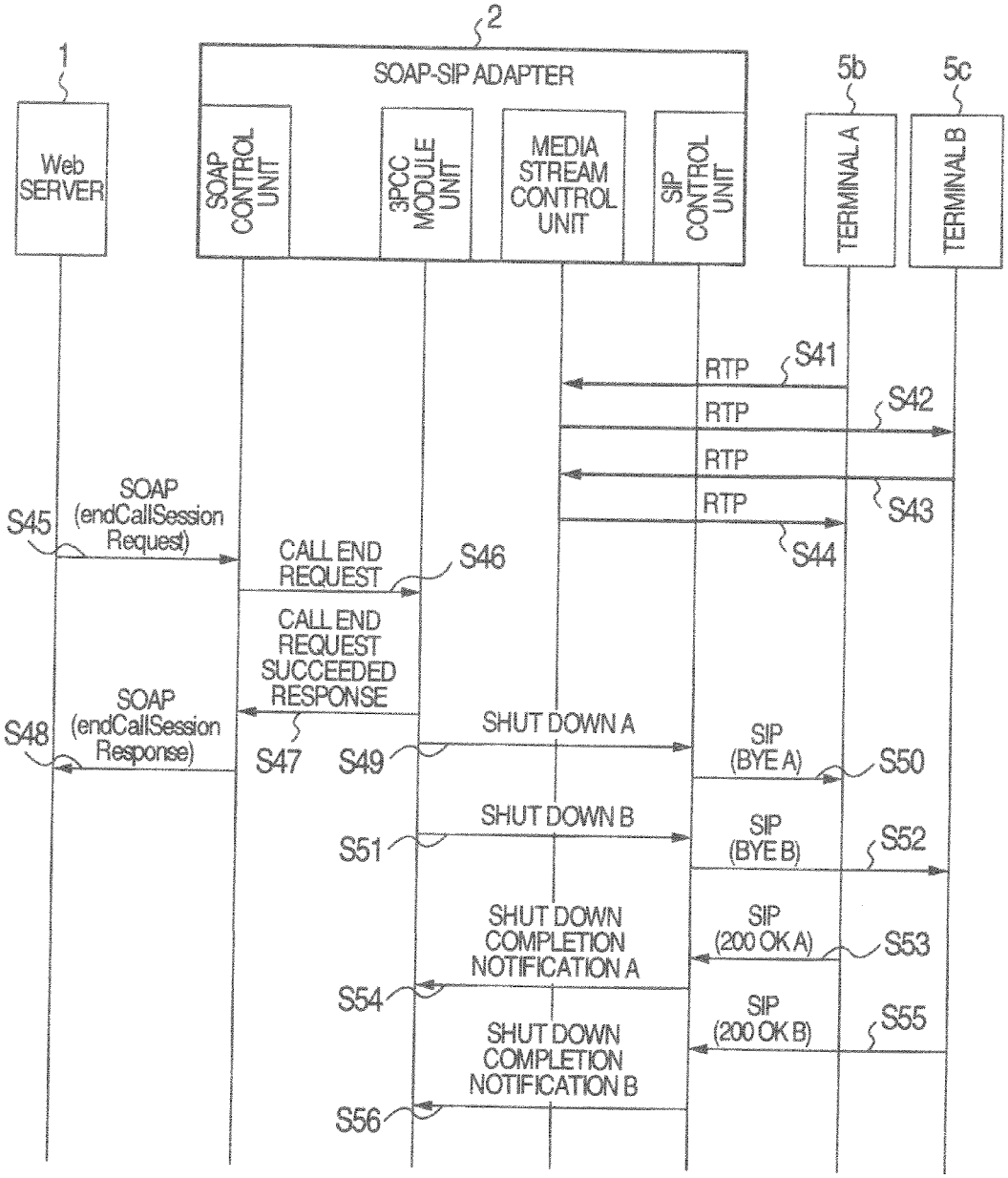

2
1
SOAP-SIP ADAPTER
5b
5c
Web SERVER
SOAP CONTROL UNIT
3PCC MODULE UNIT
MEDIA STREAM CONTROL UNIT
SIP CONTROL UNIT
TERMINAL A
TERMINAL B
RTP
S41
RTP
S42
RTP
RTP
S43
S44
S45
SOAP (endCallSession Request)
CALL END REQUEST
S46
CALL END REQUEST SUCCEEDED RESPONSE
S47
S48
SOAP (endCallSession Response)
SHUT DOWN A
S49
SIP (BYE A)
S50
SHUT DOWN B
S51
SIP (BYE B)
S52
SHUT DOWN COMPLETION NOTIFICATION A
S54
SIP (200 OK A)
S53
SHUT DOWN COMPLETION NOTIFICATION B
S56
SIP (200 OK B)
S55

FIG. 16

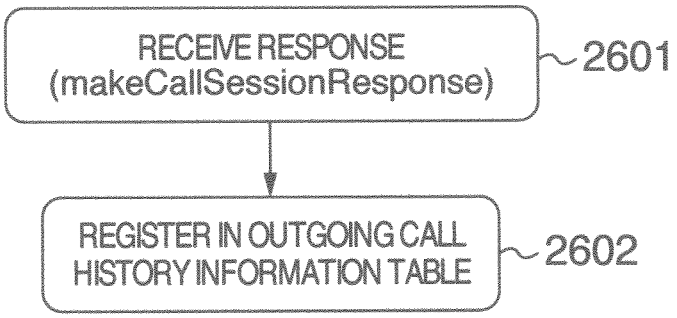

RECEIVE RESPONSE
(makeCallSessionResponse)
2601
REGISTER IN OUTGOING CALL
HISTORY INFORMATION TABLE
2602

FIG. 17

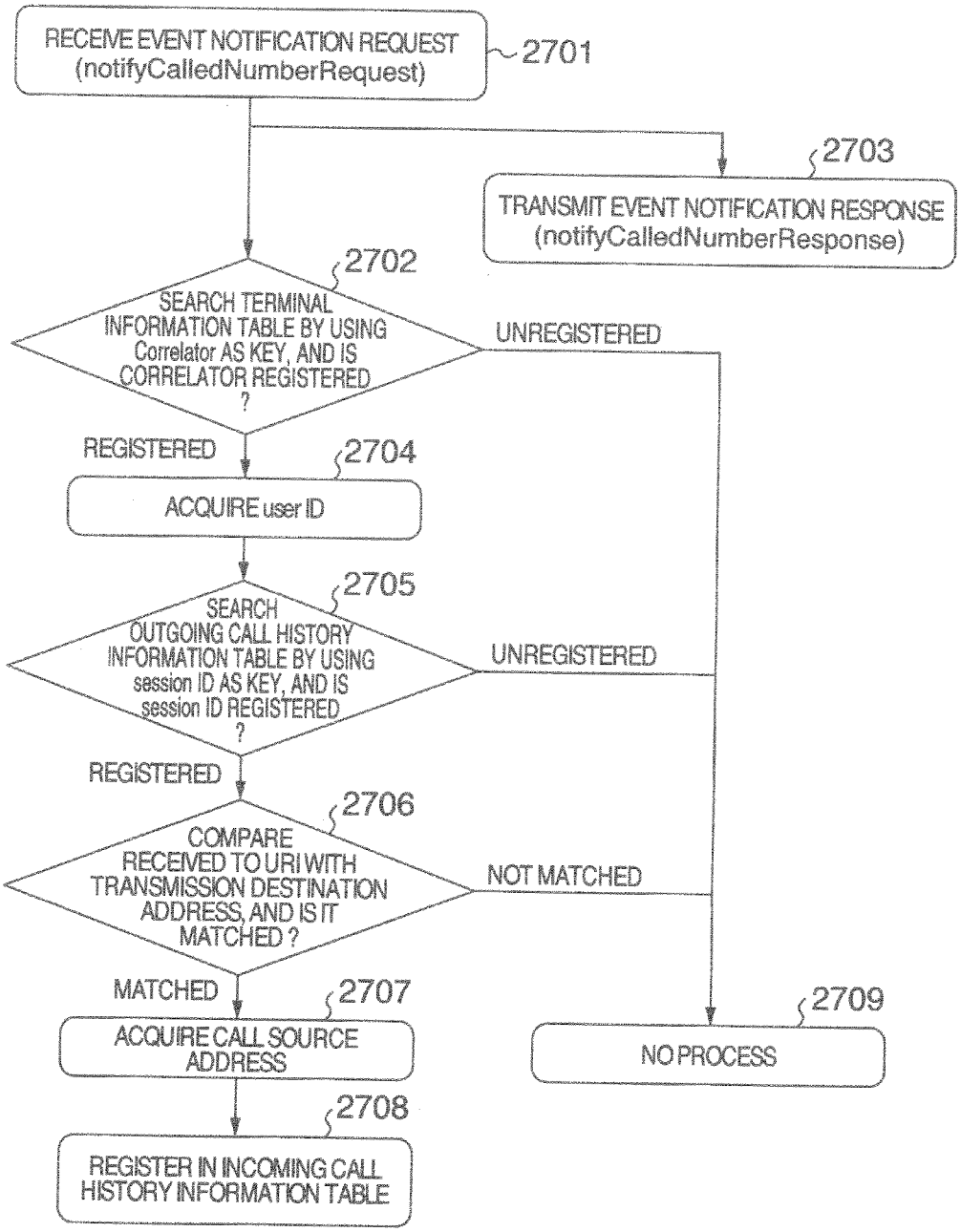

RECEIVE EVENT NOTIFICATION REQUEST (notifyCalledNumberRequest)
2701
2703
TRANSMIT EVENT NOTIFICATION RESPONSE (notifyCalledNumberResponse)
2702
SEARCH TERMINAL INFORMATION TABLE BY USING Correlator AS KEY, AND IS CORRELATOR REGISTERED ?
UNREGISTERED
REGISTERED
2704
ACQUIRE user ID
2705
SEARCH OUTGOING CALL HISTORY INFORMATION TABLE BY USING session ID AS KEY, AND IS session ID REGISTERED ?
UNREGISTERED
REGISTERED
2706
COMPARE RECEIVED TO URI WITH TRANSMISSION DESTINATION ADDRESS, AND IS IT MATCHED ?
NOT MATCHED
MATCHED
2707
ACQUIRE CALL SOURCE ADDRESS
2709
NO PROCESS
2708
REGISTER IN INCOMING CALL HISTORY INFORMATION TABLE

FIG. 18

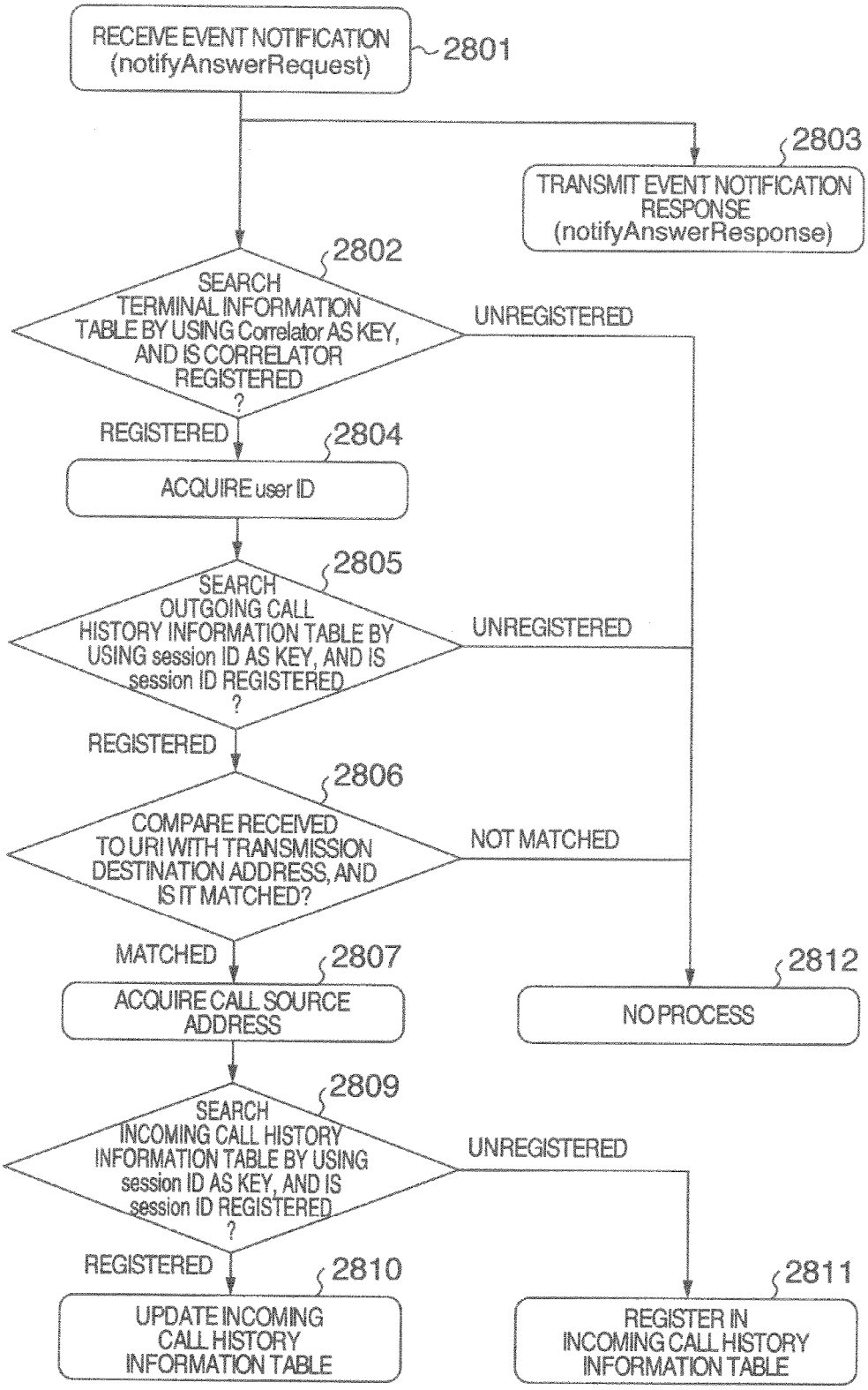

RECEIVE EVENT NOTIFICATION (notifyAnswerRequest)
2801
2803
TRANSMIT EVENT NOTIFICATION RESPONSE (notifyAnswerResponse)
2802
SEARCH TERMINAL INFORMATION TABLE BY USING Correlator AS KEY, AND IS CORRELATOR REGISTERED ?
UNREGISTERED
REGISTERED
2804
ACQUIRE user ID
2805
SEARCH OUTGOING CALL HISTORY INFORMATION TABLE BY USING session ID AS KEY, AND IS session ID REGISTERED ?
UNREGISTERED
REGISTERED
2806
COMPARE RECEIVED TO URI WITH TRANSMISSION DESTINATION ADDRESS, AND IS IT MATCHED?
NOT MATCHED
MATCHED
2807
ACQUIRE CALL SOURCE ADDRESS
2812
NO PROCESS
2809
SEARCH INCOMING CALL HISTORY INFORMATION TABLE BY USING session ID AS KEY, AND IS session ID REGISTERED ?
UNREGISTERED
REGISTERED
2810
UPDATE INCOMING CALL HISTORY INFORMATION TABLE
2811
REGISTER IN INCOMING CALL HISTORY INFORMATION TABLE

FIG. 19

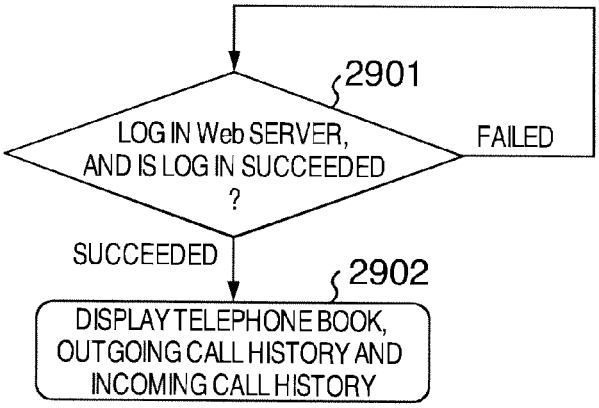


FIG. 20A

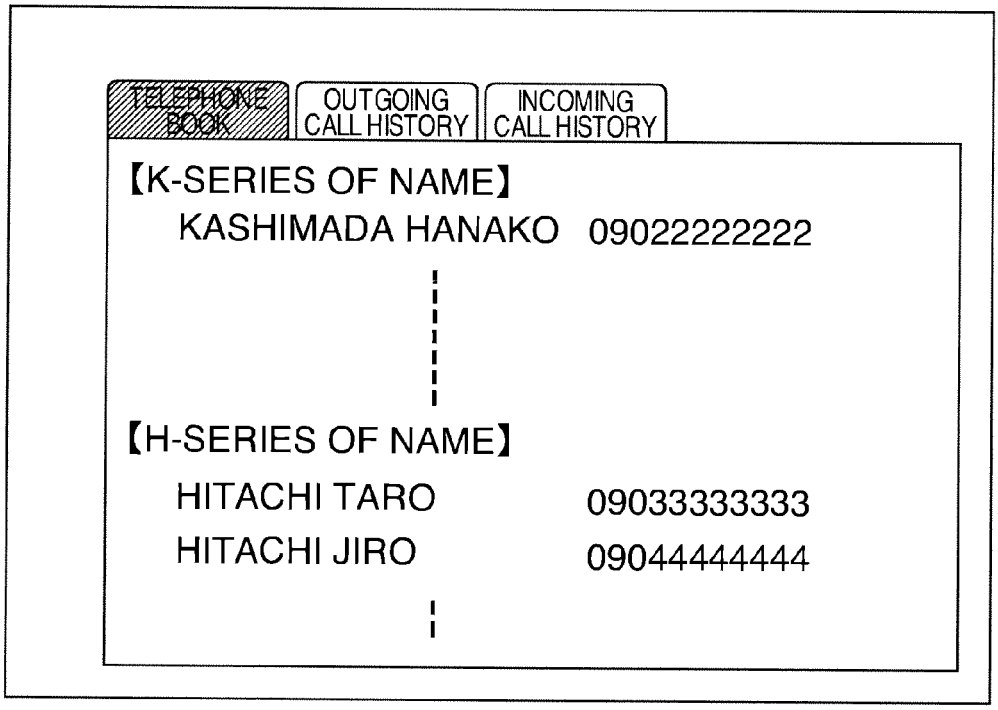


FIG. 20B

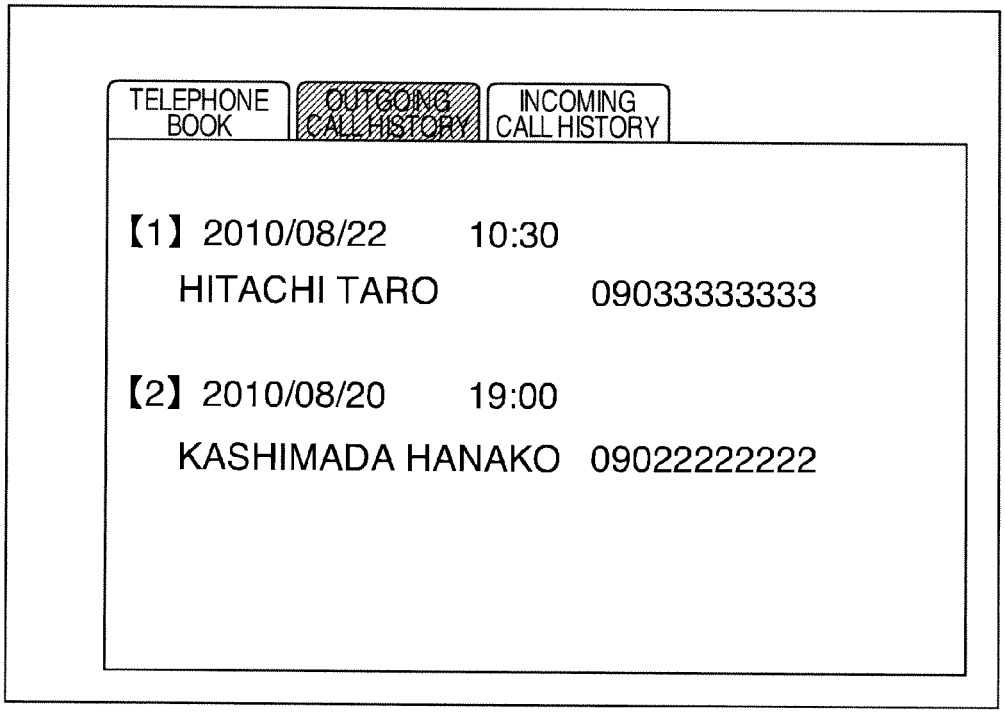
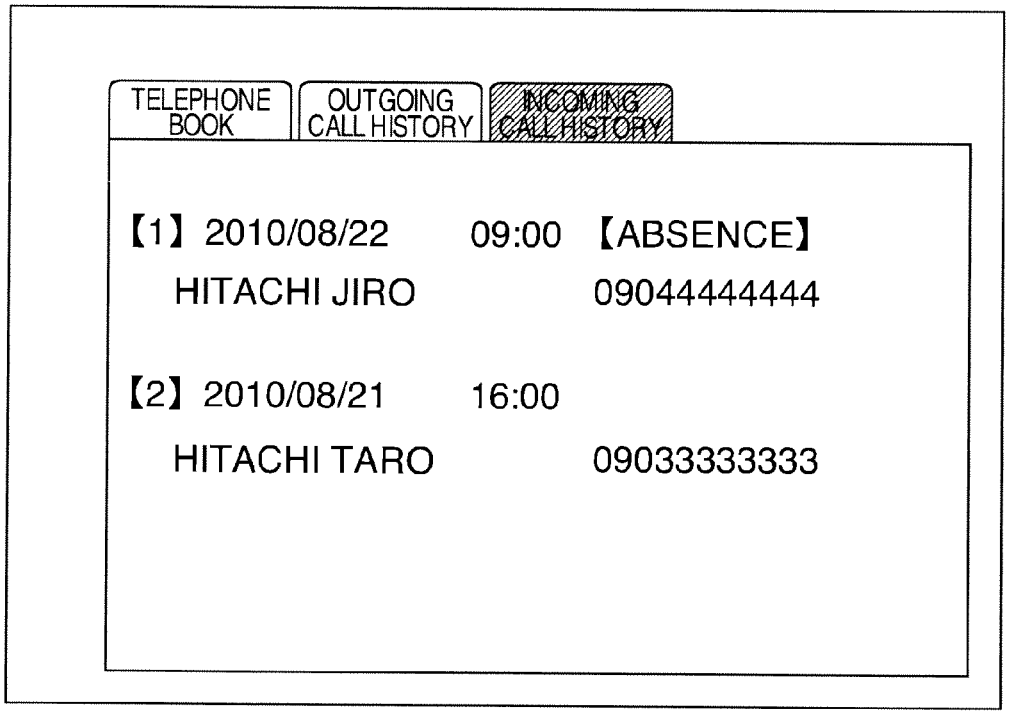


FIG. 20C



COMMUNICATION SYSTEM AND SERVER

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

Japan Priority Application 2010-252440, filed Nov. 11, 2010 including the specification, drawings, claims and abstract, is incorporated herein by reference in its entirety. This application is a Continuation of U.S. application Ser. No. 13/220,210, filed Aug. 29, 2011, incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

The present invention relates to a communication system and a server, and in particularly to a technique for a point-to-point connection method in the next-generation network.

In recent years, researches regarding the next-generation communication network have actively been implemented by telecommunication corporations using IP (Internet Protocol). This type of the next-generation communication network is referred to as NGN (Next Generation Network). In this NGN, a session is secured for between a server and a client, both of which try to communicate with each other, therefore, a method of managing a band for every session is often employed. In also this NGN, there has existed SIP (Session Initiation Protocol) as a session control protocol for use in securing the band, for example.

JP-A-2008-78878 discloses a technique such that a band securing session used for a band security is secured in a band-guarantee type network by replacing a client device with a session substitute device, when the client device, which does not equip a control protocol of the band securing session, communicates with in the band-guarantee type network.

Further, SOAP (Simple Object Access Protocol) for exchanging information between applications has been known.

JP-A-2010-213027 discloses a technique for transferring data for between two parties to be communicated, in NGN on which a communication quality is guaranteed.

SUMMARY OF THE INVENTION

In NGN, it is required that an IP address for securing both a signaling channel and a data channel should be the same. To this end, it is impossible to substitute for securing the data channel between two parties (first and second connection terminal) in such a way that they communicate in an existing 3PCC (Third Party Call Control) service flow. In SPCC service flow, first, the session is secured for between a device equipping 3PCC and the first connection terminal. Next, the session is secured for the device equipping 3PCC and the second connection terminal. When a telephone call occurs between the first connection terminal and the second connection terminal, the session is secured and completed with the first connection terminal to then start the session to be secured with the second connection terminal. Here, in the 3PCC service, a third party, different from the two parties to be communicated with each other, calls the two parties, therefore, a telephone number to be notified is not information of the connection terminal for a communication start source (call source) but becomes information of the third party, when the first or second connection terminal receives an absence incoming call. For this reason, the first or second connection terminal cannot specify the connection terminal of the communication start source, therefore, there is a problem that a return call cannot be made, for example.

According to a first aspect of the invention, a communication system provides a server and a communication device communicated with the server and set a connection between a first terminal and a second terminal by an SIP (Session Initial Protocol), wherein the communication device comprises: a first control unit that receives a connection request from the server; and a second control unit that sets the connection between the first terminal and the second terminal by the SIP protocol when receiving the connection request, and the server comprises: a first memory that stores terminal information of the first terminal and the second terminal; a second memory that stores outgoing call history information of at least either the first terminal or the second terminal; a third memory that stores incoming call history information of at least either first terminal or the second terminal; and a processing unit that reads out the information from the first memory to control at least either the information of the second memory or the third memory in accordance with information contained in a notification from the communication device when setting the connection between at least either the first terminal or the second terminal and the communication device.

According to a second aspect of the invention, a server that controls of setting a connection between a first terminal and a second terminal via a communication device for setting the connection between the first terminal and the second terminal by an SIP protocol, comprising: a first memory that stores terminal information of the first terminal and the second terminal; a second memory that stores outgoing call history information of at least either the first terminal or the second terminal; a third memory that stores incoming call history information of at least either the first terminal or the second terminal; and a processing unit reads out the information from the first memory in accordance with information contained in a notification from the communication device to control the information of at least either the second memory or the third memory when setting the connection between at least either the first terminal or the second terminal and the communication device.

In the 3PCC service, a connected terminal of the communication start source (call source) can be specified and outgoing call history information corresponding to users can also be extracted from other than the specified connected terminal when the outgoing call history infotination is managed for every user of the connected terminals.

The other objects, features and advantages of the invention will become apparent from the following description of the embodiments of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an explanatory diagram showing a configuration example of a communication network in one embodiment of the invention;

FIG. **2** is an explanatory diagram showing a configuration example in a SOAP-SIP adapter in the embodiment;

FIG. **3**A is an explanatory diagram showing one configuration example of a session information table in the SOAP-SIP adapter in the embodiment;

FIG. **3**B is an explanatory diagram showing one configuration example of a call participant information table in the SOAP-SIP adapter in the embodiment;

FIG. **3**C is an explanatory diagram showing one configuration example of a terminal information table in the SOAP-SIP adapter in the embodiment;

FIG. **3**D is an explanatory diagram showing one configuration example of a media stream control information table in the SOAP-SIP adapter in the embodiment;

FIG. **4** is a configuration diagram showing a Web server;

FIG. **5**A is an explanatory diagram showing one configuration example of a terminal information table in the Web server in the embodiment;

FIG. **5**B is an explanatory diagram showing one configuration example of a telephone book table in the Web server in the embodiment;

FIG. **5**C is an explanatory diagram showing one configuration example of an outgoing call history information table in the Web server in the embodiment;

FIG. **5**D is an explanatory diagram showing one configuration example of an incoming call history information table in the Web server in the embodiment;

FIG. **6** is a sequence diagram for explaining a procedure of generating the outgoing call history information in a 3PCC service;

FIG. **7** is a flowchart for explaining a generation of a session ID and connection ID in the SOAP-SIP adapter;

FIG. **8** is a flowchart for explaining an operation at a time of receiving a call start request in the SOAP-SIP adapter in the embodiment;

FIG. **9** is a flowchart for explaining an operation at a time of receiving a call information (session information) request in the SOAP-SIP in the embodiment;

FIG. **10** is a flowchart for explaining an operation at a time of receiving a call participant information request in the SOAP-SIP adapter in the embodiment;

FIG. **11** is a flowchart for explaining an operation at a time of receiving a call end request in the SOAP-SIP adapter in the embodiment;

FIG. **12** is a sequence diagram for explaining a media stream transfer in the embodiment;

FIG. **13** is a sequence diagram for explaining a procedure at a time of receiving the call information (session information) request in the SOAP-SIP adapter in the embodiment;

FIG. **14** is a sequence diagram for explaining a procedure at a time of receiving the call participant information request in the SOAP-SIP adapter in the embodiment;

FIG. **15** is a sequence diagram for explaining a procedure at a time of receiving the call end request in the SOAP-SIP adapter in the embodiment;

FIG. **16** is a flowchart for explaining an operation of generating an outgoing call history in the Web server;

FIG. **17** is a flowchart for explaining an operation of generating an incoming call history in the Web server;

FIG. **18** is a flowchart for explaining an operation at a time of generating the incoming call history in the Web server;

FIG. **19** is a flowchart for explaining an operation of referring pieces of data of the telephone book, outgoing call history and incoming call history in the Web server;

FIG. **20**A is a diagram showing a display example of telephone book data;

FIG. **20**B is a diagram showing a display example of outgoing call history data; and

FIG. **20**C is a diagram showing a display example of incoming call history data.

DESCRIPTION OF THE EMBODIMENTS

(Network Configuration)

FIG. **1** is an explanatory diagram showing a configuration example of a communication network in one embodiment.

The communication network (system) provides a Web server **1**, an SOAP-SIP adapter (communication device) **2**, an SIP server **3**, an HGW (Home Gateway) **4***a* and **4***b*. The SIP server **3** is installed on an NGN (Next Generation Network) N**2**, for example.

The Web server **1** communicates with the SOAP-SIP adapter **2** and also communicates with a terminal **5***a* via a network, such as Internet N1 etc. The Web server **1** further communicates respectively with a terminal A5b via the NGN N2 and HGW **4***a* and via a network such as the Internet N1 etc., and with a terminal B5c via the NGN N2 and HGW **4***b* and via a network such as Internet N1 etc. The SOAP-SIP adapter **2** communicates with the terminal A5b via NGN N2 and HGW **4***a*, as well as with the terminal B5c.

FIG. **2** is an explanatory diagram showing a configuration example of the SOAP-SIP adapter **2** in the embodiment.

The SOAP-SIP **2** provides, for example, a processor (hereinafter, CPU) **2001**, interfaces (hereinafter, IF) **2003***a*, **2003***b* and a memory **2004**. The memory **2004** has an SOAP control unit **2101**, a 3PCC module unit **2102**, a media stream control unit **2103** and an SIP control unit **2104**. The 3PCC module unit **2102** has a session information table **2010**, and the media stream control unit **2103** has a media stream control information table **2040**. The session information table **2010** has a call participant information table **2020** and a terminal information table **2030**.

The CPU **2001** implements processes in the SOAP-SIP adapter **2**. Specifically, the CPU **2001** manages the SOAP control unit **2101**, 3PCC module unit **2102**, media stream control unit **2103** and SIP control unit **2104** present on the memory **2004**. The IF **2003***a*, **2003***b* are used as an interface for communicating respectively with the Web server **1** and NGN N2 via lines **2002***a*, **2002***b*.

FIG. **3**A is an explanatory diagram showing a configuration example of the session information table **2010** in the SOAP-SIP adapter **2** in the embodiment.

The session information table **2010** stores a session condition **2012**, a call participant condition **2020** and terminal information **2030**_A, **2030**_B in correspondence to a session ID **2011**, for example.

The session ID **2011** is a session identifier corresponding to a connection request from the Web server **1** to identify a communication between the terminal A5b and terminal B5c. The session condition **2012** indicates a session condition indicated by the session ID **2011**, including "Initial (initial condition)." "Connected (connection condition)," "Terminated (Termination condition)." etc. The call participant condition **2020** (FIG. **3**B) is equivalent to the call participant information table **2020**, and the detail of call participant information table **2020** will be described later. The terminal information **2030** (FIG. **3**C) is equivalent to the terminal information table **2030**, and the terminal information **2030** is stored in every terminal. In an illustrated example, terminal information (used for Client A) **2030**_A corresponds to the terminal A5b, and a terminal information (used for Client B) **2030**_B corresponds to the terminal B5c. The detail of terminal information table **2030** will be described later.

FIG. **3**B is an explanatory diagram showing one configuration example of the call participant information table **2020** in the SOAP-SIP adapter **2** in the embodiment.

The call participant information table **2020** stores a URI **2021**, a call condition **2022** and a start time (clock time) **2023** for every terminal.

The URI **2021** indicates an SIP-URI corresponding to a user, and the call condition **2022** indicates the session condition of SIP between the SOAP-SIP adapter **2** and terminals **5***b*, **5***c*. The call condition **2022** indicates, for example, "CallParticipantInitial (initial condition)," "CallParticipantConnected (connection condition)," "CallParticipantTerminated (termination condition), etc. The start time **2023** indicates a clock time when the session of SIP is secured for the terminals **5***b*, **5***c* by the SOAP-SIP adapter **2**.

FIG. **3**C is an explanatory diagram showing one configuration example of the terminal information table **2030** in the SOAP-SIP adapter **2** in the embodiment.

The terminal information table **2030** stores, for example, parameters etc. for use in the SIP, including a handle value **2031**, a session ID **2032**, a terminal condition **2033**, a Role **2034**, send SDP (Session Description Protocol) information **2035**, recv SDP information **2036**, a From URI **2037**, and a To URI **2038**.

The handle value **2031** is information for discriminating respectively the session of SIP between the SOAP-SIP adapter **2** and terminal B5b and of SIP between the SOAP-SIP adapter **2** and terminal B5c. The session ID **2032** corresponds to the session ID **2011** in the above-mentioned session information table **2010**. The terminal condition **2033** indicates a condition until the session is secured for between the SOAP-SIP adapter **2** and terminals **5***b*, **5***c*. The terminal condition **2033** indicates, for example, "Initial (initial condition)," "ConnectWait (condition where a 'response' is waited for)," "CallComplete (condition where the 'response' is accepted and session with UA is secured)," "CloseWait (condition where a 'shut-down completion notification' is waited for)," "Closed (termination condition)," etc. In addition, the "Initial" and "ConnectWait" correspond to "CallParticipantInitial" of the call condition **2022** stored in the call participant information table **2020**. Further, the "CallComplete" and "CloseWait" correspond to "CallParticipantConnected" of the call condition **2022** stored in the call participant information table **2020**. The "CloseWait" corresponds to "CallParticipantTerminated" of the call condition **2022**.

The Role **2034** is information indicating an outgoing call side and incoming call side. The send SDP information **2035** contains, for example, an IP address and port number of the SOAP-SIP adapter **2**. The recv SDP information **2036** contains, for example, the IP address and port number of the terminal A5b or B5c. The From URI **2037** indicates a transmission source URI of an SIP message to be transmitted by the SOAP-SIP adapter **2**. The From URI **2037** is also an SIP-URI of the SOAP-SIP adapter **2**, for example. The To URI **2038** indicates a transmission destination of the SIP message to be transmitted by the SOAP-SIP adapter **2**. The To URI **2038** is the SIP-URI of the terminal A5b or B5c, for example.

FIG. **3**D is an explanatory diagram showing a configuration example of the media stream control information table **2040** in the SOAP-SIP adapter **2** in the embodiment.

The media stream control information table **2040** stores, for example, a media stream transmission/reception IP address **2042**, a media stream transmission/reception port number **2043**, a destination IP address (**1**) **2044**, a destination port number (**1**) **2045**, a destination IP address (**2**) **2046** and a destination port number (**2**) **2047**, in correspondence to a session ID **2041**.

The session ID **2041** corresponds to the session ID **2011** in the session information table **2010**. The media stream transmission/reception IP address **2042** and media stream transmission/reception port number **2043** are respectively the IP address and port number of the IFs **2003***a*, **2003***b* used for when the SOAP-SIP adapter **2** transfers a media stream. The pairs of the destination IP address (**1**) **2044**/destination port number (**1**) **2045** and the destination IP address (**2**) **2046**/destination port number (**2**) **2047** indicate a transfer destination of the media stream. For example, when the transmission source of media stream corresponds to the destination IP address (**1**) **2044** and destination port number (**1**) **2045**, the media stream is transferred to the corresponding destination IP address (**2**) **2046** and destination port number (**2**) **2047** as a transfer destination. Likewise, when the transmission source of media stream corresponds to the destination IP address (**2**) **2046** and destination port number (**2**) **2047**, the media stream is transferred to the corresponding destination IP address (**1**) **2044** and destination port number (**1**) **2045** as a transfer destination. In an illustrated example, the destination IP address (**1**) **2044** and destination port number (**1**) **2045** indicate the IP address and port number of the terminal A5b, and the destination IP address (**2**) **2046** and destination port number (**2**) **2047** indicate the IP address and port number of the terminal B5c.

FIG. **4** is a configuration diagram of the Web server **1**.

The Web server **1** provides, for example, a processing unit **100**, an input unit **110**, a display unit **120**, a storage unit **130** and a communication interface **140**. The input unit **110** accepts a session ID and a user identifier, for example, and the display unit **120** displays the user identifier and SIP-URI. The storage unit **130** has a terminal information table (memory) **2400**, a telephone book table (memory) **2410**, an outgoing call history information table (memory) **2420** and an incoming call history information table (memory) **2430**. The communication interface **140** is an interface of communicating with the SOAP-SIP adapter **2**, for example. The processing unit **100** implements various processes in the Web server **1**, that is, controls (reads out, stores information, updates information, etc.) an after-mentioned terminal information table **2400**, telephone book table **2410** and an outgoing call history information table **2420**.

FIG. **5**A is an explanatory diagram showing a configuration example of the terminal information table **2400** in the Web server **1** in the embodiment. The terminal information table **2400** stores information regarding the individual terminals, each of which corresponds at least to a user ID, a terminal ID and a telephone number. In addition, the information stored in the table may be a combination of all of aftermentioned information or of arbitrary necessary information.

For example, the terminal information table **2400** stores a terminal ID **2402**, a terminal name **2403**, a telephone number **2404**, a correlator **2405** and a terminal registration condition **2406**, in correspondence to a user ID **2401**.

The user ID **2401** is an identifier for the user who uses the 3PCC service. The terminal ID **2402** is an identifier for a communication terminal possessed by a certain user. Here, one user ID may be corresponded to plural terminals (plural terminal IDs). In FIG. **5**A, the user ID **0001** corresponds to a terminal ID **01** as a "fixed terminal" and to a terminal ID **02** as a "mobile terminal." The terminal name **2403** is a name for the communication terminal. The telephone number **2404** indicates a telephone number corresponding to the terminal ID of communication terminal possessed the user. The correlator **2405** is an identifier indicating an association with an event notification from the SOAP-SIP adapter **2**. The event notification means a notification in a call setting by the SOAP-SIP adapter **2**, and the association with this event notification means parameters for determining whether a handling is nec-

essary for the event notification. The terminal registration condition **2406** indicates a condition whether the event notification is already registered in the SOAP-SIP adapter **2**.

FIG. **5**B is an explanatory diagram showing one configuration example of the telephone book table **2410** in the Web server **1** in the embodiment. The telephone book table **2410** stores information regarding the individual users, each of which corresponds at least to a user ID, a connection destination designated address (for example, SIP-URI) and a display address (for example, telephone number). Here, the user ID corresponds to a user who holds information of a name **2413**, a phonetic symbol **2414**, an address **2415** and display address **2416** in a telephone book, but it does not simply relate to the name **2413**.

The telephone book table **2410** stores, for example, the user ID **2412**, name **2413**, phonetic symbol **2414**, address **2415** and display address **2416**, in correspondence to an ID **2411**.

The ID **2411** is an identifier for managing data. The user ID **2412** corresponds to the user ID **2401** in the above-mentioned terminal information table **2400**. The name **2413** is a name of the user who uses the 3PCC service and is also information corresponding one-to-one to the user ID **2412**. The phonetic symbol **2414** is information corresponding one-to-one to the name **2413** to be able to use by a sort when displaying the telephone book. The address **2415** indicates the SIP-URI of the users, and the display address is information, for example a telephone number, to be displayed on the terminal which refers to the telephone book, among the contents in the address **2415**.

FIG. **5**C is an explanatory diagram of one configuration example of the outgoing call history information table **2420** in the Web server **1** in the embodiment. The outgoing call history information table **2420** stores information regarding the individual outgoing calls, each of which corresponds at least to the user ID, session ID, call destination information, call source information and outgoing call time information. In addition, the information stored in the table may be a combination of all of after-mentioned information or of arbitrary necessary information.

For example, the outgoing call history information table **2420** stores a user ID **2422**, a session ID **2423**, a call destination address **2424**, a call destination address display name **2425**, a call destination name **2426**, a call source address **2427** and an outgoing call date and time **2428**, in correspondence to an ID **2421**.

The ID **2421** is an identifier for managing data. The user ID **2422** corresponds to the user ID **2401** in the above-mentioned terminal information table **2400**. The session ID **2423** corresponds to the session ID **2011** in the above-mentioned session information table **2010**. The call destination address **2424** is a terminal as an incoming call side, for example, the SIP-URI of terminal B5c. The call destination address display name **2425** is information, for example a telephone number, displayed on the terminal which refers to an outgoing call history, among the contents in the call destination address **2424**. The call destination name **2426** corresponds to the name **2413** in the above-mentioned telephone book table **2410**. The call source address **2427** is for the terminal as outgoing call side, for example, the SIP-URI of the terminal A5 b. The outgoing call date and time **2428** is time information at a time of the outgoing call by a telephone.

FIG. **5**D is an explanatory diagram showing one configuration example of the incoming call history information table **2430** in the Web server **1** in the embodiment. The incoming call history information table **2430** stores information regarding the individual incoming calls, each of which corresponds at least to the user ID, session ID, call source information and incoming call time information. In addition, the information stored in the table may be a combination of all of aftermentioned information or of arbitrary necessary information.

For example, the incoming call history information table **2430** stores a user ID **2432**, a session ID **2433**, a call source address **2434**, a call source address display name **2435**, a call source name **2436**, an absence incoming call **2437** and an incoming call date and time **2438**, in correspondence to an ID **2431**.

The ID **2431** is an identifier for managing data. The user ID **2432** corresponds to the user ID **2401** in the above-mentioned terminal information table **2400**. The session ID **2433** corresponds to the session ID **2011** in the above-mentioned session information table **2010**. The call source address **2434** is for the terminal as outgoing call side, for example, for the SIP-URI of terminal A5 b. The call source address display name **2435** is information, for example a telephone number, displayed on the terminal which refers to an incoming call history, among the contents in the call source address **2434**. The call source name **2436** corresponds to the name **2413** in the above-mentioned telephone book table **2410**. The absence incoming call **2437** indicates a response condition from the incoming call on a destination terminal at a time of the call request. The incoming call date and time **2438** is time information at a time of the incoming call by the telephone.

(Operation)

FIG. **7** is a flowchart for explaining a generation of the session ID/connection ID in the SOAP-SIP adapter **2**. In addition, the connection ID is a parameter which can be used for when the connection is not applicable to the 3PCC, but to the NGN connection. FIG. **8** is a flowchart for explaining an operation at a time of receiving a call start request in the SOAP-SIP adapter **2** in the embodiment. Further, FIG. **6** is a sequence diagram for explaining a procedure of generating the outgoing and incoming call history information in the 3PCC service. FIG. **16** is a flowchart for explaining an operation of generating the outgoing call history in the Web server **1**. FIG. **17** and FIG. **18** are a flowchart for explaining an operation of generating the incoming call history in the Web server **1**.

In this embodiment, a connection terminal of communication start source (call source) can be specified in the 3PCC service. Further, the outgoing and incoming call history information corresponding to the respective users is extracted from other than the specific connection terminals when managing the outgoing and incoming call history information for every user of the connection terminals. The telephone book for a Web management can also be supplied.

The procedure up to the 3PCC including the generation of outgoing and incoming history information becomes the following procedure (a) to (e). (a) The SIP-URI etc. of an outgoing and incoming call history-generation targeted user is registered from the Web server **1** to the SOAP-SIP adapter **2**. (b) The session is secured for between the SOAP-SIP adapter **2** and the first connection terminal A5 b. (c) The outgoing call history information of first connection terminal A5b is generated in the Web server **1**. (d) The session is secured for between the SOAP-SIP adapter **2** and second connection terminal B5c. (e) The incoming call history information of second connection terminal B5c is generated in the Web server **1**. (f) The telephone call is implemented with between the first connection terminal A5b and the second connection terminal B5c. However, a silence condition occurs in the first connection terminal A5b at a time when the procedure (b) is completed and (d) starts. In this case, a pseudo version of an

RBT (Ringing Back Tone or connection maintaining message) is transmitted to the first connection terminal A5b from the SOAP-SIP adapter **2**.

In the NGN, there is a requirement that the IP address should be the same for securing a signaling channel and a data channel, therefore, it is impossible to substitute for securing the data channel between two parties (between first connection terminal A5b and second connection terminal B5c) in such a way that they communicate in the existing 3PCC service flow. In this point, data from the first connection terminal A5b is received by the SOAP-SIP adapter **2** to transfer the data to the second connection terminal B5c, in this embodiment. The SOAP-SIP adapter **2** receives the data from the second connection terminal B5c to then transfer the data to the first connection terminal A5 b. The SOAP-SIP adapter **2** also generates the media stream control information table **2040** for realizing the above-mentioned transfer.

Further, the SOAP-SIP adapter **2** as a third party, different from the two parties (first connection terminal A5b and second connection terminal B5c) to be communicated with each other, calls the two parties in the 3PCC service, therefore, a telephone number to be notified becomes information of the SOAP-SIP adapter **2**, when the first connection terminal A5b or second connection terminal B5c receives the absence incoming call. For this reason, the first or second connection terminal cannot specify the connection terminal of the communication start source (call source), therefore, there is a problem that a return call cannot be made. Consequently, the outgoing and incoming call history information in the 3PCC service is generated on the Web server **1**, in this way, the outgoing and incoming call history information corresponding to user information (log in ID etc.) to be necessary for the communication is provided for the terminal communicable with the Web server **1**.

A procedure of this embodiment will be described below with reference to the sequence diagram and flowchart.

The sequence flow will be described with reference to FIG. **6**. First, a manager of the Web server **1** logs in the Web server **1**, and information of the user etc. who uses the 3PCC is entered to register in the terminal information table **2400**. For example, registered contents contains the user ID **2401**, terminal ID **2402** for discriminating plural terminals, terminal name **2403**, telephone number **2404** and correlator **2405**. Next, the Web server **1** transmits an SOAP startCallNotificationRequest (notification start request) to the SOAP-SIP adapter **2**, at a step S**16**. The SOAP startCallNotificationRequest contains the SIP-URI corresponding to the user who is targeted of the notification request of connection condition and the correlator as a value for indicating an association. The SOAP-SIP adapter **2** transmits an SOAP startCallNotificationResponse (notification start response) received, at a step S**17**. The Web server **1** updates the terminal registration condition **2406** in the terminal information table **2400** from "unregistered" to "registered" (an initial value is "unregistered") in response to the reception of the SOAP startCallNotificationResponse. Next, the user as a third party or the manager for Web server **1** operates the terminal **5***a* to log in the Web server **1**. The Web server **1** receives, from the terminal **5***a*, an identifier (user ID corresponding to the user who uses the terminals A5b or B5c, for example) of the user to be communicated. For example, the users of two parties to be communicated may be selected by operation of the user, along with a screen displaying the logged in terminal **5***a*, in the Web server **1**.

The Web server **1** transmits an SOAP makeCallSessionRequest (connection request) to the SOAP-SIP adapter **2**, at a step S**1**. The SOAP makeCallSessionRequest contains the SIP-URI corresponding to the users of connection request targeted two parties. The Web server **1** acquires the SIP-URI corresponding to the user identifier (user ID) entered by searching the telephone book table **2410** in which the user identifier (user ID) is stored correspondingly to the SIP-URI of the user. The Web server **1** also generates the SOAP makeCallSessionRequest containing the acquired SIP-URI to transmit to the SOAP-SIP adapter **2**. The SOAP-SIP adapter **2** starts the connection to the terminals **5***b*, **5***c*, each of which corresponds to the SIP-URI contained in the received SOAP makeCallSessionRequest to transmit an SOAP makeCallSessionResponse containing the session ID generated by the SOAP-SIP adapter **2**, at steps S**2** to S**15**. At this time, the Web server **1** registers the outgoing call history in the outgoing call history information table **2420** for the first connection terminal A5b corresponding to the user information (SIP-URI) determined as the call source address, among the piece of user information (SIP-URI) of the connection request targeted two parties contained in the SOAP makeCallSessionRequest.

For example, the outgoing call history information table **2420** contains the session ID **2423**, call destination address (SIP-URI of the second connection terminal A5c) **2424**, call destination address display name **2425**, call destination name **2426**, call source address (SIP-URI of the first connection terminal A5 b) **2427** and outgoing call date and time **2428**, contained in the SOAP makeCallSessionResponse.

Further, the Web server **1** receives an SOAP notifiyCalledNumberRequest from the SOAP-SIP adapter **2** at a step S**23** and an SOAP notifyAnswerRequest at a step S**26**. At this time, the Web server **1** transmits an SOAP notifyCalledNumberResponse to the SOAP-SIP adapter **2**, at a step S**24** and an SOAP notifyAnswerResponse to the same, at a step S**27**. As described later, the Web server **1** registers the incoming call history in the incoming call history information table **2430**, for the second connection terminal A5c corresponding to the user information (SIP-URI) determined as the call destination address, among the piece of user information (SIP-URI) of the connection request targeted two parties contained in the SOAP makeCallSessionRequest, at steps S**18** to S**27**. For example, the incoming call history information table **2430** contains the session ID **2433**, call source address (SIP-URI of the first connection terminal A5b) **2434**, call source address display name **2435**, call source name **2436**, absence incoming call flag **2437** and incoming call date and time **2438**, contained in the SOAP makeCallSessionResponse.

Hereinafter, a detailed operation of the steps S**2** to S**15** and S**18** to S**27** regarding the SOAP-SIP adapter **2** will be described below.

The SOAP control unit **2101** in the SOAP-SIP adapter **2** receives the SOAP makeCallSessionRequest to transmit the connection request to the 3PCC module unit **2102**, at the step S**2**. This connection request can be generated from an appropriate protocol for use in the SOAP-SIP adapter **2** on the basis of the SOAP makeCallSessionRequest received, for example, and also contains SIP-URI in the SOAP makeCallSessionRequest.

The 3PCC module unit **2102** receives the connection request at steps **7001**, **8001** to generate the session ID at a step **8002**. A generation of the session ID will be described below with reference to FIG. **7**.

The 3PCC module unit **2102** receives the connection request to generate a random value at a step **7002**. The 3PCC module unit **2102** determines whether the generated random value is registered in the session ID **2011** in the session information table **2010** at a step **7003**. If the generated random value is already registered (or already used) therein, the process in 3PCC module unit **2102** returns to the step **7002** to

repeat subsequently necessary processes. In contrast, if the generated random value is unregistered, the 3PCC module unit **2102** stores the generated session ID in the session information table **2010** at a step **7004**. Further, the 3PCC module unit **2102** sets the session condition **2012** in the session information table **2010** to "Initial (initial condition)".

The 3PCC module unit **2102** also stores the SIP-URI contained in the received connection request in the call participant information table **2020**. The call participant information table **2020** in FIG. **3**B as an example, stores the SIP-URI (refer to **2020**_A) of the terminal A5b and SIP-URI (refer to **2020**_B) of the terminal B5c. The 3PCC module unit **2102** sets the call condition **2022** corresponding to the terminals **5***b*, **5***c* in the call participant information table **2020** to "CallParticipantInitial (initial condition)".

The 3PCC module unit **2102** stores the terminal information of the terminals A5b, B5c. Specifically, the 3PCC module unit **2102** makes the generated session ID correspond to the terminals **5***b*, **5***c* to store in the terminal information table **2030**. The 3PCC module unit **2102** also stores the respective SIP-URIs contained in the received connection request in the To URI **2038** corresponding to the respective terminals **5***b*, **5***c* in the terminal information table **2030**. The 3PCC module unit **2102** sets respectively the terminal condition **2033** corresponding to the terminals **5***b*, **5***c* in the terminal information table **2030** to "Initial (initial condition)". The 3PCC module unit **2102** sets respectively information indicating the outgoing call side or incoming call side to the Role **2033** corresponding to the terminals **5***b*, **5***c* in the terminal information table **2030**. In addition, either the terminal **5***b* or **5***c* can be set appropriately to the outgoing call side. The 3PCC module unit **2102** also stores the IP address and port number of SOAP-SIP adapter **2** in the send SDP information **2035** in the terminal information table **2030**. The 3PCC module unit **2102** also stores the SIP-URI of SOAP-SIP adapter **2** in the From URI **2037** corresponding to the terminals **5***b*, **5***c* in the terminal information table **2030**. In addition, the SIP-URI, IP address and port number of SOAP-SIP adapter **2** are stored in an appropriate storage unit in advance.

The 3PCC module unit **2102** generates a connection request succeeded response to transmit to the SOAP control unit **2101**, at the step S**3** and a step **8011**. The connection request succeeded response contains the generated session ID. The SOAP control unit **2101** receives the connection request succeeded response to transmit the SOAP makeCallSessionResponse to the Web server **1**, at the step S**4** and a step **8012**. The SOAP makeCallSessionResponse contains the generated session ID and is generated in accordance with the SOAP on the basis of the received connection request succeeded response. The Web server **1** receives the SOAP makeCallSessionResponse to store the session ID contained in the SOAP makeCallSessionResponse in an appropriate storage unit.

In addition, if the generation for session ID is failed at the step **8002**, the 3PCC module unit **2102** generates a connection request failed response (error response message) at a step **8013** to transmit to the SOAP control unit **2101**. The SOAP control unit **2101** receives the connection request failed response to transmit the makeCallSessionResponse to the Web server **1** at the step **8012**.

Next, the session is secured for between the SOAP-SIP adapter **2** and terminal A5b.

More specifically, the 3PCC module unit **2102** acquires a port used for a media stream control/transfer at a step **8003** and transmits an outgoing call request (A) for the terminal A5b to the SIP control unit **2104** at the step S**5** and a step **8004**. For example, the 3PCC module unit **2102** transmits, to the SIP control unit **2104**, the outgoing call request containing the send SDP information **2035**, From URI **2037** and To URI **2038**, corresponding to the terminal A5b, stored in the terminal information table **2030**. The 3PCC module unit **2102** also sets a clock time at this time, as one example, to the start time **2023** corresponding to the terminal A5b in the call participant information table **2020**. The call participant information table **2020** shown, as an example, in FIG. **3**B stores "2010.08.22 10:30.30". In addition, the start time **2023** is not limited to the clock time at this time, may also be an appropriate clock time indicating the start of session with the terminal A5b.

The SIP control unit **2104** transmits an INVITE message (A) to the terminal A5b in accordance with the To URI contained in the outgoing call request (A) at the step S**6**. The INVITE message (A) contains at least the send SDP information, From URI and To URI, contained in the received outgoing call request, for example. The SIP control unit **2104** also generates the handle value for discriminating the session with the terminal A5b.

The terminal A5b receives the INVITE message (A) to store, in an appropriate storage unit, the IP address and port number of SOAP-SIP adapter **2** contained in the send SDP information of the received INVITE message (A). The stored IP address and port number are used for when transmitting the media stream, for example. The terminal A5b generates the recv SDP information containing the own IP address and port number to transmit a (200 OK) (A) of SIP containing the generated recv SDP information to the SOAP-SIP adapter **2** at the step S**7**. The SIP control unit **2104** in the SOAP-SIP adapter **2** receives the (200 OK) (A) to transmit an SIP (ACK A) to the terminal A5b at the step S**8**.

The SIP control unit **2104** transmits the response notification (A) to the 3PCC module unit **2102**, at the step S**9** and at a step **8005**. The response notification (A) contains the handle value generated at the step S**6** and the recv SDP information **2036** of terminal A5b contained in the SIP 200 OK received at the step S**7**. The 3PCC module unit **2102** makes the handle value and recv SDP information contained in the received response notification (A) correspond to the terminal A5b and store in the terminal information table **2030**. In addition, the handle value may be stored at an appropriate timing between the steps S**6** to S**8**. The 3PCC module unit **2102** updates the terminal condition **2033** corresponding to the terminal A5b in the terminal information table **2030** to "CallComplete (session secured condition)". The 3PCC module unit **2102** also updates the call condition **2022** corresponding to the terminal A5b in the call participant information table **2020** to "CallParticipantConnected (connection condition)". In addition, the terminal condition **2033** may be updated appropriately in response to the transmission/reception of the SIP message (for example, 200 OK, etc.).

The 3PCC module unit **2102** also transmits the generated session ID, IP address and port number of the SOAP-SIP adapter **2**, and IP address and port number of the terminal A5b contained in the received recv SDP information to the media stream control unit **2103**. The media stream control unit **2103** stores respectively the received pieces of information in the media stream control information table **2040**. For example, the media stream control unit **2103** stores the received IP address and port number of the SOAP-SIP adapter **2** in both the media stream transmission/reception IP address **2042** and the media stream transmission/reception port number **2043** and also stores the received IP address and port number of the terminal A5b in the both the destination IP address (**1**) **2044** and destination port number (**1**) **2045**. The media stream control unit **2103** also stores the received session ID therein.

The 3PCC module unit **2102** transmits the pseudo RBT transmission request to the media stream control unit **2103** at a step S**101**. The media stream control unit **2103** receives the pseudo RBT transmission request to transmit the pseudo RBT to the terminal A5b in accordance with an RTP (Real-time Transport Protocol), for example, at the step S**10** and a step **8006**. The media stream control unit **2103** may use an announcement indicating that a destination is being accessed, appropriate music sound, etc. as used for the pseudo RBT.

Next, the session is secured for between the SOAP-SIP adapter **2** and terminal B5c.

The 3PCC module unit **2102** transmits an outgoing call request (B) for the terminal B5c to the SIP control unit **2104** at the step S**11** and a step **8007**. For example, the 3PCC module unit **2102** transmits, to the SIP control unit **2104**, the outgoing call request containing the send SDP information **2035**, From URI **2037** and To URI **2038** corresponding to the terminal B5c stored in the terminal information table **2030**. The 3PCC module unit **2102** also sets a clock time at this time to the start time **2023** corresponding to the terminal B5c in the call participant information table **2020**. The call participant information table **2020** shown in FIG. **3**B stores "2010.10.08. 10:30.45".

The SIP control unit **2104** transmits an INVITE message (B) to the terminal B5c in accordance with the To URI contained in the outgoing call request (B) at the step S**12**. The INVITE message (B) contains at least the send SDP information, From URI and To URI contained in the received outgoing call request, for example. The SIP control unit **2104** also generates the handle value for discriminating the session with the terminal B5c.

The terminal B5c receives the INVITE message (B) to store, in an appropriate storage unit, the IP address and port number of SOAP-SIP adapter **2** contained in the send SDP information of the received INVITE message (B).

The terminal B5c also transmits an SIP **180** Ringing (calling notification) indicating that it is being called, to the SOAP-SIP adapter **2** at the step S**20**. The SIP control unit **2104** in SOAP-SIP adapter **2** receives the SIP **180** Ringing to transmit a ringing notification to the 3PCC module unit **2102**, at the step S**21**. Thereafter, the 3PCC module unit **2102** transmits the connection notification to the SOAP control unit **2101** at the step S**22**, and the SOAP control unit **2101** then transmits the SOAP notifyCalledNumberRequest (connection notification, connection notification event) to the Web server **1** at the step S**23**. The SOAP notifyCalledNumberRequest contains the correlator, From URI, To URI and session ID, for example. At this time, the Web server **1** searches the terminal information table **2400** by using the received correlator as a key to acquire the user ID **2401**. Next, the outgoing call history information table **2420** is searched by using the received session ID as a key, the call destination address **2424** is compared with the received To URI, and the call source address **2427** is acquired if they are equivalent. The user ID and call source address acquired by the above-mentioned manner are registered in the incoming call history information table **2430**. The call source display address and name acquired by searching the telephone book table **2410** by using either the received correlator or session Ill as a key, may be registered, or registered together with the corresponding session ID to the call source display address and name. At this time, the absence incoming call flag is not updated (initial value is "true" in the absence incoming call flag, which becomes an absence incoming call condition).

When the registration in the incoming call history information table **2430** is implemented by using the SIP **180** Ringing as a trigger, the generation of incoming call history information can be realized in real time since the condition is that the terminal is being called demonstratively. Here, the SIP **180** Ringing is used as a trigger for registering in the incoming call history information table **2430**, however, the session connection process to the terminal can be set to a trigger. That is, an action of the connection process to the terminal is used as a trigger, or the INVITE may also be used as a trigger. When the INVITE is used as a trigger, the registration in the incoming call history information table can be implemented even though the terminal B5c stays on a condition (power source is OFF or the terminal is in out of service) where the telephone call cannot be made by any reason.

When the call destination address **2424** is different from the received To URI as result of searching the outgoing call history information by using the session ID as a key, the SOAP notifyCalledNumberRequest may be discarded. That is, it is determined that the incoming call history information is not targeted for the generation and update when the call destination address is different from the received To URI. For example, this case is that the receive To URI is equivalent to the call source address.

The Web server **1** transmits the SOAP notifyCalledNumberResponse to the SOAP control unit **2101** in response to the SOAP notifyCalledNumberRequest at the step S**24**. The terminal B5c generates the recv SDP information containing own IP address and port number to transmit the SIP 200 OK (B) containing the generated recv SDP information to the SOAP-SIP adapter **2** at the step S**13**. The SIP control unit **2104** in SOAP-SIP adapter **2** receives the SIP 200 OK (B) to transmit an SIP ACK (B) to the terminal B5c at the step S**14**.

The SIP control unit **210** transmits the response notification (B) to the 3PCC module unit **2102** at the step S**15** and a step **8008**. The response notification (B) contains the handle value generated at the step S**12** and the recv SDP information of the terminal B5c contained in the received SIP 200 OK at the step S**13**. The 3PCC module unit **2102** makes the handle value and recv SDP information contained in the received response information (B) correspond to the terminal B5c and store in the terminal information table **2030**. In addition, the handle value may be stored at an appropriate timing between the steps S**12** to S**14**. The 3PCC module unit **2102** updates the terminal condition **2033** corresponding to the terminal B5c in the terminal information table **2030** to "CallComplete (session secured condition)". The 3PCC module unit **2102** also updates the call condition **2022** corresponding to the terminal B5c in the call participant information table **2020** to "CallParticipantConnected (connection condition)". The 3PCC module unit **2102** further updates the session condition in the session information table **2010** to "Connected (connection condition)".

Next, the 3PCC module unit **2102** transmits a connection response notification to the SOAP control unit **2101** at the step S**25**, and the SOAP notifyAnswerRequest (response notification, response notification event) to the Web server **1** at the step S**26**. The SOAP notifyAnswerRequest contains the correlator, From URI, To URI and session ID, for example. At this time, the Web server **1** searches the terminal information table **2400** by using the received correlator as a key to acquire the user ID **2401**. Next, the outgoing call history information table **2420** is searched by using the received session ID as a key to compare the call destination address **2424** with the received To URI. If they are equivalent, the call source address **2427** is acquired. Subsequently, the incoming call history information table **2430** is searched by using the received session ID as a key to update the absence incoming call flag to "false", that is, to a normal incoming call condition. If there is no incoming call history, a new registration is

implemented for the incoming call history information table **2430**. If the call destination address **2424** is different from the received To URI, the call source address **2427** is discarded. The Web server **1** then transmits the SOAP notifyAnswerResponse to the SOAP control unit **2101** in response to the SOAP notifyAnswerRequest at the step S**27**.

The 3PCC module unit **2102** transmits the session ID and IP address and port number of the terminal B5c contained in the received recv SDP information to the media stream control unit **2103**. The media stream control unit **2103** stores the IP address and port number of terminal B5c in the destination IP address (**2**) **2046** and destination port number (**2**) **2047** in the media stream control information table **2040**, in correspondence to the received session ID.

The 3PCC module unit **2102** transmits a pseudo RBT stop request to the media stream control unit **2103** at a step S**102** and a step **8009**. The media stream control unit **2103** stops the transmission of pseudo RBT in accordance with the pseudo RBT stop request.

The SOAP-SIP adapter **2** starts a media stream transfer for between the terminals A5b and B5c at a step **8010**.

FIG. **12** is a sequence diagram regarding the media stream transfer. This sequence is implemented at least for the step S**102** and subsequent steps shown in FIG. **6**. For example, the terminal A5b transmits the media stream to the SOAP-SIP adapter **2** in accordance with the RTP at a step S**12-1**. At this time, the terminal A5b sets the IP address and port number of SOAP-SIP adapter **2** stored at the step S**6** to the destination to then set the own IP address and port number to a transmission source.

The media stream control unit **2103** in SOAP-SIP adapter **2** refers to the media stream control information table **2040** to transfer the received media stream to the terminal B5c at a step S**12-2**. For example, the media stream control unit **2103** refers to the media stream control information table **2040** on the basis of the transmission source IP address and port number of the received media stream to acquire corresponding destination IP address and port number. In the example of media stream control information table **2040** shown in FIG. **3**D, the transmission source IP address and port number of the received media stream correspond respectively to the IP address (10.0.2.1) and port number (**20000**) of terminal A5b to acquire the corresponding destination IP address (**2**) **2046** (10.0.2.2) and port number (**2**) **2047** (**30000**). The media stream control unit **2103** transfers the received media stream to the terminal B5c in accordance with the acquired IP address and port number.

Likewise, the terminal B5c transmits the media stream to the SOAP-SIP adapter **2** in accordance with the RTP at a step S**12-3**. Likewise to the terminal A5b, the terminal B5c sets the IP address and port number of SOAP-SIP adapter **2** stored at the step S**12** to the destination to set the own IP address and port number to the transmission source.

The media stream control unit **2103** in SOAP-SIP adapter **2** refers to the media stream control information table **2040** to transfer the received media stream to the terminal A5b at a step S**12-4**. In the example of media stream control information table **2040** shown in FIG. **3**D, the transmission source IP address and port number of the received media stream correspond respectively to the IP address (10.0.2.2) and port number (**30000**) of the terminal B5c to acquire the corresponding destination IP address (**1**) **2044** (10.0.2.1) and port number (**1**) **2045** (**20000**). The media stream control unit **2103** transfers the received data stream to the terminal A5b in accordance with the acquired IP address and port number.

FIG. **13** is a sequence diagram for explaining a procedure of receiving call information (session information) request in the SOAP-SIP adapter **2** in the embodiment. FIG. **9** is a flowchart for explaining an operation at a time of receiving the call information (session information) request in the SOAP-SIP adapter **2** in the embodiment.

Referring to FIG. **13** and FIG. **9**, an operation for acquiring the call information by the Web server **1** will described below. Here, Web server **1** can acquire information corresponding to the designated session ID. The process at steps S**21** to S**24** in FIG. **13** corresponds to that at the above-mentioned steps S**12-1** to S**24-4**.

The Web server **1** transmits an SOAP getCallSessionInformationRequest (session information request, call information request) to the SOAP-SIP adapter **2** at a step S**25**. The SOAP getCallSessionInformationRequest contains the session ID of the call information to be acquired. More specifically, the Web server **1** generates the SOAP getCallSessionInformationRequest containing the session ID stored at the above-mentioned step S**4** to transmit to the SOAP-SIP adapter **2**. In addition, the Web server **1** may select the session ID of the call information to be acquired from the session ID stored at the above-mentioned step S**4** on the basis of the user operated terminal **5***a*.

The SOAP-SIP adapter **2** searches the session information table **2010** held in the SOAP-SIP adapter **2** by using the session ID contained in the SOAP getCallSessionInformationRequest as a key to then transmit an SOAP getCallSessionInformationResponse containing the table information of corresponded session ID **2011** at steps S**26** to S**28**. A detailed operation of the steps S**26** to S**28** in the SOAP-SIP adapter **2** will be described below.

First, the SOAP control unit **2101** in SOAP-SIP adapter **2** receives the getCallSessionInformationRequest to transmit the session information request to the 3PCC module unit **2102** at the step S**26**. This session information request contains the session ID in the SOAP getCallSessionInformationRequest.

The 3PCC module unit **2102** receives the session information request at a step **9001** to search the session ID **2011** in the session information table **2010** on the basis of the session ID contained in the received session information request at a step **9002**. If the session ID contained in the received session information request is already registered in the session information table **2010**, the session information corresponding to the session ID **2011** is specified at a step **9003**. The 3PCC module unit **2102** refers to the call participant information table (call participant condition) **2020** corresponding to the corresponded session ID **2011** to acquire respectively the URI **2021** and call condition **2022** corresponding to the terminals **5***b*, **5***c*, at a step **9004**. Further, the 3PCC module unit **2102** acquires the recv SDP information **2036** for the respective terminals from the terminal information (for terminal A5 b) **2030**_A and terminal information (for terminal B5c) **2030**_B corresponding to the corresponded session ID **2011**.

The 3PCC module unit **2102** generates a session information request succeeded response containing the session ID **2011**, received URI **2021**, call condition **2022** and recv SDP information **2036** at a step **9005** to then transmit the generated session information request succeeded response to the SOAP control unit **2101** at the step S**27**. The SOAP control unit **2101** receives the session information request succeeded response to transmit an SOAP getCallSessionInformationResponse (session information request succeeded response) to the Web server **1** at the step S**28** and a step **9006**. The SOAP getCallSessionInformationResponse contains the session ID, URI, call condition and recv SDP information in the received session information request succeeded response, which is generated in accordance with the SOAP.

In addition, if the session ID contained in the received session information request is unregistered at the step **9002**, the 3PCC module unit **2102** generates a session information request failed response (error response message) at a step **9007** to transmit the generated session information request failed response to the SOAP control unit **2101**. The SOAP control unit **2101** receives the session information request failed response to transmit, to the Web server **1**, the SOAP getCallSessionInformationResponse indicating that the session information request is failed, at the step **9006**.

The Web server **1** receives the SOAP getCallSessionInformationResponse to refer to the call condition contained in the received SOAP getCallSessionInformationResponse, therefore, the condition of session, indicating whether a requested communication is realized, can be confirmed. When the call is ended from the terminal, the call condition becomes "CallParticipantsTerminated (termination condition)", and the Web server **1** can determine that the call is terminated from the terminal A5b or B5c. For example, when the call condition is not normal, the Web server **1** may stop the communication by using an after-mentioned SOAP endCallSessionRequest.

FIG. **14** is a sequence diagram for explaining a procedure at a time of receiving the call participant information request in the SOAP-SIP adapter **2** in the embodiment. FIG. **10** is a flowchart for explaining an operation at a time of receiving the call participant information request in the SOAP-SIP adapter **2** in the embodiment.

Referring to FIG. **14** and FIG. **10**, an operation for acquiring the call participant information by the Web server **1** will be described below. Here, user information corresponding to the designated SIP-URI can be acquired. The process at steps S**31** to S**34** in FIG. **14** corresponds to that at the above-mentioned steps S**12-1** to S**12-4**.

The Web server **1** transmits an SOAP getCallParticipantsInformationRequest (call participant information request) to the SOAP-SIP adapter **2** at a step S**35**. The SOAP getCallParticipantsInformationRequest contains the session ID and URI of the call participant information to be acquired. Specifically, the Web server **1** generates the session ID stored at the above-mentioned step S**4** and the SOAP getCallSessionInfomrationRequest containing the SIP-URI of the desired call participant to transmit to the SOAP-SIP adapter **2**, for example. As one example, the Web server **1** may select the session ID of the call information to be acquired on the basis of the user operation and the user identifier (user ID, for example, user ID corresponding to the user who uses terminals Mb and B5c) from the terminal **5***a*. In addition, Web server **1** can acquire the SIP-URI corresponding to the entered user identifier (user ID) by searching the telephone book table **2410** in which the user identifier (user ID) and SIP-URI of its user are stored correspondingly with each other.

The SOAP-SIP adapter **2** searches the session information table **2010** held in the SAO-SIP adapter **2** by using the session ID contained in the SOAP getCallParticipantsInformationRequest as a key to specify the table information of the corresponded session ID **2011**. The SOAP-SIP adapter **2** further searches the call participant information table **2020** by using the SIP-URI contained in the SOAP getCallParticipantsInformationRequest as a key to transmit an SOAP getCallParticipantsInformationResponse containing the table information corresponding to the corresponded SIP-URI **2021** at steps S**36** to S**38**. An operation of the steps S**36** to S**38** in the SOAP-SIP adapter **2** will be described below.

The SOAP control unit **2101** in SOAP-SIP adapter **2** receives the SOAP getCallParticipantsInformationRequest to transmit the call participant information request to the 3PCC module unit **2102** at the step S**36**. This call participant information request contains the session ID and SIP-URI in the SOAP getCallParticipantsInformationRequest. The 3PCC module unit **2102** receives the call participant information request at the step **1001** to search the session ID **2011** in the session information table **2010** on the basis of the session ID contained in the received call participant information request at the step **1002**. If the session ID contained in the received call participant information request is already registered in the session information table **2010**, the session information is specified by the corresponded session ID **2011** at the step **1003**. The 3PCC module unit **2102** searches the URI **2021** in the call participant information table (call participant condition) **2020** corresponding to the corresponded session ID **2011** on the basis of the SIP-URI contained in the received call participant information request at the step **1004**. If the SIP-URI contained in the received call participant information request is already registered, the 3PCC module unit **2102** acquires the call condition **2022** corresponding to the corresponded URI **2021**, at the step **1005**. The 3PCC module unit **2102** also refers to the To URI **2038** in the terminal information table **2030** on the basis of the SIP-URI contained in the received call participant information request to acquire the corresponded recv SDP information **2036**.

The 3PCC module unit **2102** generates the call participant information request succeeded response containing the acquired call condition **2022** and recv SDP information **2036** at the step **1006** to transmit the generated call participant information request succeeded response to the SOAP control unit **2101** at the step S**37**. The SOAP control unit **2101** receives the call participant information request succeeded response to transmit the SOAP getCallParticipantsInformationResponse (call participant information request succeeded response) to the Web server **1** at the step S**38** and the step **1007**. The SOAP getCallParticipantsInformationResponse contains the URI, call condition and recv SDP information in the received call participant information request succeeded response, which is generated in accordance with the SOAP.

In addition, if the session ID contained in the received call participant information request is unregistered at the step **1002** and the SIP-URI contained in the received call participant information request is unregistered at the step **1004**, the 3PCC module unit **2102** generates the call participant information request failed response (error response message) at the step **1008** to transmit the generated call participant information request failed response to the SOAP control unit **2101**. The SOAP control unit **2101** receives the call participant information request failed response to transmit the SOAP getCallParticipantsInformationResponse, indicating that the call participant information request is failed, to the Web server **1** at the step **1007**.

FIG. **15** is a sequence diagram for explaining a procedure at a time of receiving a call end request in the SOAP-SIP adapter **2** in the embodiment. FIG. **11** is a flowchart for explaining an operation at a time of receiving the call end request in the SOAP-SIP adapter **2** in the embodiment.

An operation, when the Web server **1** ends the call, will be described with reference to FIG. **15** and FIG. **11**. The process at steps S**41** to S**44** in FIG. **15** corresponds to that at the above-mentioned steps S**12-1** to S**12-4**.

The Web server **1** transmits an SOAP endCallSessionRequest (call end request) to the SOAP-SIP adapter **2** at a step S**45**. The SOAP endCallSessionRequest contains the session ID of the call to be ended. More specifically, the Web server **1** generates the SOAP endCallSessionRequest containing the session ID stored at the above-mentioned step S**4** to transmit to the SOAP-SIP adapter **2**. As one example, the Web server

1 may select the session ID of the call to be ended, from the session ID stored at the above-mentioned step S4 by the terminal 5*a*.

The SOAP-SIP adapter 2 searches the session information table 2010 held in the SOAP-SIP adapter 2 by using the session ID contained in the SOAP endCallSessionRequest as a key to specify the terminals 5*b* or 5*c* to be shut down from the table information of the corresponded session ID 2011 and shut down the terminal 5*b* and/or 5*c* at steps S46 to S56. A detailed operation of the steps S46 to S56 in the SOAP-SIP adapter 2 will be described below.

The SOAP control unit 2101 in SOAP-SIP adapter 2 receives the SOAP endCallSessionRequest (call end request) to transmit the call end request to the 3PCC module unit 2102 at the step S46. This call end request contains the session ID in the SOAP endCallSessionRequest. The 3PCC module unit 2102 receives the call end request at a step 1101 to search the session ID 2011 in the session information table 2010 on the basis of the session ID contained in the received call end request at a step 1102.

If the session ID contained in the received call end request is already registered in the session information table 2010, the 3PCC module unit 2102 generates a call end request succeeded response at a step 1109 to transmit the generated call end request succeeded response to the SOAP control unit 2101 at the step S47. The SOAP control unit 2101 receives the call end request succeeded response to transmit an SOAP endCallSessionReponse (call end request succeeded response) to the Web server 1 at the step S48 and a step 1110. In addition, an only succeeded response may be transmitted to the Web server 1 other than the SOAP endCallSessionReponse.

The session information is specified by the corresponded session ID 2011 to specify the two parties (here, terminals A5b, B5c) on the telephone call at a step 1103. For example, the 3PCC module unit 2102 refers to the call participant information table 2020 corresponding to the session ID contained in the received call end request to acquire the SIP-URI 2021 of the terminals A5 b. B5c. The media stream control unit 2103 stops the media stream transfer at a step 1104. In addition, a media stream transfer stop request may be transmitted from the 3PCC module unit 2102 to the media stream control unit 2103.

The 3PCC module unit 2102 transmits a shut-down request (A) containing the acquired SIP-URI to the SIP control unit 2104 in accordance with one of the acquired SIP-URIs at the step S49 and a step 1105. The SIP control unit 2104 receives the shut-down request (A) to transmit a BYE message (A) of the SIP to the terminal A5b, as set the SIP-URI contained in the received shut-down request (A) to the To URI at the step S50.

Likewise, the 3PCC module unit 2102 transmits a shut-down request (B) containing the acquired SIP-URI to the SIP control unit 2104 in accordance with the other of the acquired SIP-URIs at the step S51 and a step 1106. The SIP control unit 2104 receives the shut-down request (B) to transmit a BYE message (B) to the terminal B5c, as set the SIP-URI contained in the received shut-down request (B) to the To URI at the step S52.

The terminal A5b transmits the 200 OK (A) for the BYE message (A) received at the step S50 to the SOAP-SIP adapter 2 at the step S53. The SIP control unit 2104 in the SOAP-SIP adapter 2 receives the 200 OK (A) to transmit a shut-down completion notification (A) to the 3PCC module unit 2102 at the step S54 and a step 1107.

Likewise, the terminal B5c transmits a 200 OK (B) for the BYE message (B) received at the step S52 to the SOAP-SIP adapter 2, at the step S55. The SIP control unit 2104 in SOAP-SIP adapter 2 receives the 200 OK (B) to transmit a shut-down completion notification (B) to the 3PCC module unit 2102 at the step S56 and a step 1108.

In addition, if the session ID contained in the received call end request is unregister at the step 1102, the 3PCC module unit 2102 generates a call end request failed response (error response message) at a step 1111 to transmit the generated call end request failed response to the SOAP control unit 2101. The SOAP control unit 2101 receives the call end request failed response to transmit a SOAP endCallSessionResponse indicating that the call end request is failed, to the Web server 1 at the step 1110.

FIG. 19 is a flowchart for explaining an operation of referring to the telephone book data, outgoing call history data and incoming call history data by the Web server 1.

The user who uses the 3PCC service accesses to and logs in the Web server 1 from the terminal 5*a* etc., for example. The processing unit 100 in Web server 1 searches at least one of the telephone book table, outgoing call history information table and incoming call history information table by using the user ID accepted the log-in as a key. As a result of the search, data (data group) corresponding to one user ID is extracted from each of the tables. The data (data group) extracted from the each of the tables is transmitted to the terminal 5*a*. Here, this embodiment has described such that the Web server 1 commands to the terminal 5*a* so as to transmit the data (data group) and display the data group, the data group is therefore displayed on the terminal 5*a*.

The logged in user having the user ID 2412 in the telephone book table 2410 can refer to the corresponded telephone book data, outgoing call history data, and incoming call history data. A display method is that a tab corresponding to pieces of data is used to be referred by a single window, for example.

FIG. 16 is a flowchart for explaining an operation of generating an outgoing call history in the Web server. If the response (makeCallSessionResponse) is received in Step 2601, it is registered into the outgoing call history information table in Step 2602.

FIG. 17 is a flowchart for explaining an operation of generating an incoming call history in the Web server. If the event notification request is received in Step 2701, the terminal information table is searched by using Correlator as key in Step 2702 while the event notification response is transmitted in Step 2703. If the Correlator in Step 2702 is registered, the user ID is acquired in Step 2704. If the Correlator in Step 2702 is not registered, no process is performed in Step 2709. After acquiring the user ID in Step 2704, the outgoing call history information table is searched by using session ID as key in Step 2705. If the Correlator in Step 2705 is registered, the received To URI is compared with the transmission destination address in Step 2706. If these are matched in Step 2706, the call source address is acquired in Step 2707 and further it is registered in the incoming call history information table is Step 2708. If the Correlator in Step 2705 is not registered or if these are not matched in Step 2706, no process is performed in Step 2709.

FIG. 18 is a flowchart for explaining an operation at a time of generating the incoming call history in the Web server. If the event notification request is received in Step 2801, the terminal information table is searched by using Correlator as key in Step 2802 while the event notification response is transmitted in Step 2803. If the Correlator in Step 2802 is registered, the user ID is acquired in Step 2804. If the Correlator in Step 2802 is not registered, no process is performed in Step 2812. After acquiring the user ID in Step 2804, the outgoing call history information table is searched by using

session ID as key in Step **2805**. If the Correlator in Step **2805** is registered, the received To URI is compared with the transmission destination address in Step **2806**. If these are matched in Step **2806**, the call source address is acquired in Step **2807**. If the Correlator in Step **2805** is not registered or if these are not matched in Step **2806**, no process is performed in Step **2812**. After acquiring the call source address in Step **2807**, the incoming call history information table is searched by using session ID as key in Step **2809**. If the session ID is registered in Step **2809**, the incoming call history information table is updated in Step **2810**. If the session ID is not registered in Step **2809**, the session ID is registered in the incoming call history information table in Step **2811**.

FIG. **19** is a flowchart for explaining an operation of referring pieces of data of the telephone book, outgoing call history and incoming call history in the Web server. In Step **2901**, after logging in the Web server, it is checked as whether the login is succeeded or failed. If failed, the process in Step **2901** is repeated. If succeeded, the telephone book, the outgoing call history and the incoming call history are displayed in Step **2902**.

FIG. **20**A shows a display example of the telephone book displaying information regarding the logged in user. FIG. **20**B shows a display example of the outgoing call history, that is, the outgoing call history of the logged in user is displayed for every session by combining the call destination, outgoing call time and call destination display address, for example. FIG. **20**C shows a display example of the incoming call history, that is, the incoming call history of the logged in user is displayed for every session by combining the call source, incoming call time and call source display address, for example.

An application may be provided such that the Web server **1** transmits the data (data group) extracted from every table to the terminal **5***a*, and the terminal **5***a* can display only the information, designated by the user, selected from the pieces of data (data group).

In addition, the registration, deletion and edition in the telephone book and the name **2413**, phonetic symbol **2414** and address **2415** in the telephone book table **2410**, may be updated by a GUI screen of the terminal **5***a*.

It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.

The invention clamed is:

1. A communication system comprising one or more computers configured with:

a server; and

a communication device configured to communicate with the server and set a connection with a plurality of terminals, the communication device comprising:

a control unit configured to process a session connection process of a session with a call source terminal and a call destination terminal by a connection request received from the server for connecting to the call source terminal and the call destination terminal, and

the server comprising:

a memory configured to store an outgoing call history information for managing an outgoing call history of a terminal of the plurality of terminals and an incoming call history information for managing an incoming call history of the terminal, and

a control unit configured to:

update an absence incoming call flag which is included in the incoming call history information of the call destination terminal to an incoming call condition after processing the session connection process, wherein the incoming call history information is configured to be managed by the server;

receive information of an incoming call of the call destination terminal corresponding to a user ID of a user using the terminal;

register an absence incoming call information as an absence incoming call condition with an incoming call history of the user ID corresponding to the call destination terminal on the basis of a connection succeeded notification sent from the call destination terminal; and

turn the absence incoming call condition of the incoming call history into a normal incoming call condition on the basis of a connection response notification sent from the communication device, the connection response notification being based on the connection succeeded notification.

2. The communication system according to claim **1**,

wherein the memory of the server is configured to manage both the outgoing call history information and the incoming call history information associated with the user ID of the user who uses the terminal,

wherein the control unit of the server is configured to:

register a call source terminal information which is included in a first response of the connection request for connecting to the call source terminal with the outgoing call history information and register the user ID of the user who uses the call source terminal with the outgoing call history information, when the server receives the first response from the communication device, and

register the call source terminal information acquired from the outgoing call history information with the incoming call history information and register the user ID of the user who uses the call source terminal with the incoming call history information, when the server receives a second response of the connection request for connecting to the call destination terminal from the communication device.

3. The communication system according to claim **1**,

wherein the call destination terminal comprises:

a control unit configured to log in the server with the user ID of the user who uses the call destination terminal, and receive the incoming call history information associated with the user ID used to log in the server.

4. The communication system according to claim **3**,

wherein a display unit of the call destination terminal is configured to display an incoming call condition of the incoming call associated with established session between the communication device and the call destination terminal, and display an absence condition of the incoming call associated with un-established session between the communication device and the call destination terminal, based on the received incoming call history information associated with the user ID.

5. A terminal for setting a connection with a communication device by the communication device which communicates with a server and receives a connection request from the server, the terminal comprising:

a control unit configured to log in the server with a user ID of a user who uses the terminal, and receive an incoming call history information associated with the user ID used to log in the server,

wherein the incoming call history information is configured to be managed by the server, and wherein the server is configured to:

receive information of an incoming call of a call destination terminal corresponding to the user ID of the user using the terminal;

register an absence incoming call information as an absence incoming call condition with the incoming call history of the user ID corresponding to the call destination terminal on the basis of a connection succeeded notification sent from the call destination terminal; and

turn the absence incoming call condition of the incoming call history into a normal incoming call condition on the basis of a connection response notification sent from the communication device, the connection response notification being based on the connection succeeded notification.

6. The terminal according to claim **5**,

wherein a display unit is configured to display an incoming call condition of the incoming call associated with established session between the communication device and the terminal, and display an absence condition of an incoming call associated with un-established session between the communication device and the terminal, based on the received incoming call history information associated with the user.

7. The terminal according to claim **5**,

wherein the terminal is a call destination terminal.

8. The terminal according to claim **7**,

wherein the incoming call history information includes an absence incoming call flag,

wherein the absence incoming call flag indicates an absence incoming call condition during processing a session connection process between the communication device and the call destination terminal, or indicates an incoming call condition after processing the session connection process between the communication device and the call destination terminal.

9. The terminal according to claim **5**,

wherein said terminal is configured to refer to the incoming call history information which registers the incoming call history, of the call destination terminal, associated with the user ID of the user who uses the call destination terminal, as a trigger for a call process of the call destination terminal.

10. The terminal according to claim **5**,

wherein the session connection process establishes a session between the call source terminal and the call destination terminal.

11. The terminal according to claim **10**, wherein,

when the server receives, from the communication device, a connection notification based on a ringing notification, which rings to the call source terminal, transmitted from the call destination terminal to the server,

said terminal is configured to refer to the incoming call history information which has an address of the call source terminal registered in the incoming call history, of the user ID corresponding to the call source terminal, which has the absence incoming call flag updated to an absence incoming call condition, based on the connection notification.

12. The terminal according to claim **5**,

wherein said terminal is configured to refer to telephone book information corresponding to the user ID used to log in the server, of telephone book information which is managed by the server and to store a telephone number of the terminal which is associated with a user ID of a user who uses the terminal.

13. The terminal according to claim **5**,

wherein the terminal is configured to refer to outgoing call history information corresponding to the user ID used to log in the server, of outgoing call history information which is managed by the server and to store a telephone number of the terminal associated with a user ID of a user who uses the terminal.

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